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**MANUAL OF THE RUSHES  
(JUNCUS SPP.)  
OF THE  
ROCKY MOUNTAINS  
AND  
COLORADO BASIN**

Rocky Mountain Forest and  
Range Experiment Station

Forest Service  
U.S. Department of Agriculture  
Fort Collins, Colorado 80521

### Abstract

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A taxonomic treatment of the 51 taxa of the critical genus *Juncus* known from the Rocky Mountains and Colorado Basin. Detailed descriptions, synonymy, key for identification, illustrations, habitats, geographic distribution and data on forage value are included.

**Keywords:** Plant taxonomy, *Juncus*, Rocky Mountains, Colorado Basin, phytogeography, forage plants, Juncaceae.

2051  
**Manual of the Rushes (Juncus spp.)  
of the  
Rocky Mountains  
and  
Colorado Basin //**

Joseph, 1906  
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## SUMMARY

*Juncus*, of the family Juncaceae, is a genus of about 120 species and numerous geographical varieties in North America. It is best developed in temperate climates. Although morphologically a close relative of the Lily Family, the genus is characterized by small, greenish, scarious flowers. In appearance the plants are decidedly grasslike. Because distinguishing characteristics are in large part minute and because many of the species bear at least a superficial resemblance to others, identification is often difficult.

In this taxonomic treatment, the 51 recognized taxa include 38 species, 11 varieties, and 2 forms.

Keys for the identification of the species and subspecific taxa are provided, as well as detailed descriptions, synonymy, accounts of geographic distribution and habitats, and illustrations. Included are a systematic list of the taxa, a glossary and bibliography.

One new name is proposed, *Juncus bufonius* var. *occidentalis* F. J. Herm., for the American plant that has been erroneously passing as *J. sphaerocarpus* Nees.



## INTRODUCTION

The Forest Service has frequently been asked to prepare a manual of the rushes of the Rocky Mountain area, similar to Agriculture Handbook No. 374 (1970), which deals with the sedges of the same region. As in *Carex*, many of the species of *Juncus* are of economic importance as forage and as a hay crop, and similar problems in their identification have been encountered by non-specialists due to the critical nature of the genus. No modern manual for the species of this area has heretofore been available. It is hoped that the present treatment will fulfill the expressed need.

The area covered by this manual is the same as that of Agriculture Handbook No. 374, *Manual of the Carices of the Rocky Mountains and Colorado Basin*. It includes the southern Rockies (in New Mexico, Colorado, and southern Wyoming); the middle Rockies (separated from the southern Rockies by the Wyoming Basin, and lying in northeastern Utah, northwestern Wyoming, and southern Idaho); and the ranges of the Colorado Basin in Arizona.

All pertinent taxonomic literature on the 38 species and 13 subspecific taxa here covered has been collated for distributional data and to bring the nomenclature up to date. Keys for identification and detailed descriptions are given. Notes on ecology and phytogeography are incorporated, and information on economic value is presented whenever available. A checklist of sections and species, a bibliography, and glossary are included. Illustrations are provided for all the taxa except the very few in which the difference from allied taxa is slight and better expressed verbally than pictorially. Grateful acknowledgment is made to the University of California Press for permission to reproduce illustrations from H. L. Mason's "Flora of the Marshes of California" (1957), to the University of Washington Press for illustrations from "Vascular Plants of the Pacific Northwest" by C. L. Hitchcock *et al.* (1969), and to Dr. Charles Fiedema of the Forest Service Herbarium for drawings of species for which illustrations were not previously available.

The classification adopted is that of Buchenau (3) as modified by Vierhapper (21), except that the species having imperfectly septate leaves in Buchenau's Section *Septati* have been segregated as Section *Ensifolii*, as was done by Coville and by Rydberg in their several treatments.

## ROCKY MOUNTAIN JNCI

### 1. SECTION POIOPHYLLI

1. *Juncus bufonius* L.
- 1a. *J. bufonius* var. *halophilus* Buch. & Fern.
- 1b. *J. bufonius* var. *occidentalis* F. J. Herm.
2. *J. compressus* Jacq.
3. *J. gerardii* Loisel.
4. *J. tenuis* Willd.
- 4a. *J. tenuis* var. *congestus* Engelm.
- 4b. *J. tenuis* var. *dudleyi* (Wieg.) F. J. Herm.
5. *J. interior* Wieg.
6. *J. confusus* Coville
7. *J. brachyphyllus* Wieg.
8. *J. vaseyi* Engelm.

### 2. SECTION GENUINI

9. *J. effusus* L. var. *compactus* Hoppe in Lej. & Court.
- 9a. *J. effusus* var. *exiguus* Fern. & Wieg.
- 9b. *J. effusus* var. *brunneus* Engelm.
10. *J. filiformis* L.
11. *J. drummondii* E. Mey.
- 11a. *J. drummondii* var. *subtriflorus* (E. Mey.) C. L. Hitchc.
12. *J. parryi* Engelm.
13. *J. hallii* Engelm.
14. *J. balticus* Willd. var. *montanus* Engelm.
- 14a. *J. balticus* var. *vallicola* Rydb.
15. *J. mexicanus* Willd.

### 3. SECTION THALASSII

16. *J. acutus* L. var. *sphaerocarpus* Engelm.

### 4. SECTION GRAMINIFOLII

17. *J. marginatus* Rostk.
- 17a. *J. marginatus* var. *setosus* Coville
18. *J. regelii* Buch.
19. *J. longistylis* Torr.
- 19a. *J. longistylis* var. *scabratus* F. J. Herm.
20. *J. macrophyllus* Coville
21. *J. covillei* Piper var. *obtusatus* (Engelm.) C. L. Hitchc.
22. *J. bryoides* F. J. Herm.

### 5. SECTION ALPINI

23. *J. biglumis* L.
24. *J. albescens* (Lange) Fern.
25. *J. castaneus* J. E. Smith.

#### 6. SECTION SEPTATI

- 26. *J. brachycephalus* Engelm.
- 27. *J. tweedyi* Rydb.
- 28. *J. acuminatus* Michx.
- 29. *J. nodosus* L.
- 30. *J. torreyi* Coville
- 31. *J. articulatus* L.
- 32. *J. alpinus* Vill.
- 33. *J. mertensianus* Bong.
- 34. *J. nevadensis* Wats.
- 34a. *J. nevadensis* var. *badius* (Suksd.) C. L. Hitchc.

#### 7. SECTION ENSIFOLII

- 35. *J. ensifolius* Wikst.
- 36. *J. xiphioides* E. Mey.
- 37. *J. tracyi* Rydb.
- 38. *J. saximontanus* A. Nels.
- 38a. *J. saximontanus* f. *brunnescens* (Rydb.) F. J. Herm.

## JUNCUS L. RUSH

Perennial or, infrequently, annual, cespitose to strongly rhizomatous, grasslike herbs with terete to flattened, leafless to leafy stems; leaves glabrous, with a sheathing base, the sheath often prolonged upward on the sides at the juncture with the blade to form rounded to acuminate auricles, the blade from terete to laterally or dorsiventrally flattened, often with conspicuous partitions (septa) within; inflorescence terminal (sometimes appearing lateral when the involucre bract is terete and prolonged), cymose, diffuse and panicle-like to greatly congested, sometimes of one to many capitate clusters, the flowers small, greenish to purplish-brown, few (rarely only one) to many, the lowest (involucral) bract sometimes reduced but often greatly elongate, flat to terete; perianth regular, more or less chaff-like or scale-like in texture, persistent during fruiting, undifferentiated, the segments subequal or the inner series often the shorter; stamens 6 or 3 (when the latter, opposite the outer perianth segments), the filaments from shorter to much longer than the anthers; ovary superior; capsule loculicidal, three-valved, one-celled with three parietal placentae or three-celled from the intrusion of the placentae; seeds numerous, minute, usually more or less fusiform, often apiculate to caudate at one or both ends, faintly reticulate or areolate.

Distinguished from our other Juncaceous genus, *Luzula*, by its glabrous leaves and numerous (instead of three) seeds, and from other genera of the Liliales by its sedge-like aspect and from the grasses and sedges by its perianth of 6 segments and its capsular fruit.

## KEY TO THE SPECIES

1. Low annuals; leaves narrow, rarely over 1 mm wide, often involute.
2. Plants at least 3 cm tall, the flowers usually lateral as well as terminal on the stems; perianth segments 2-7 mm long; stamens 6.
3. Capsule oblong to oblong-ovoid, 3-4.5 mm long; perianth segments 4-7 mm long; plants often over 15 cm tall.
  4. Flowers inserted singly at the nodes, remote; perianth segments plainly exceeding the capsule, the inner acuminate; seeds apiculate ..... 1. *J. bufonius*
  4. Flowers often in twos or threes and more or less congested; inner perianth segments obtuse, barely exceeding the capsule; seeds abruptly truncate at the ends .....
    - ..... 1a. *J. bufonius* var. *halophilus*
3. Capsule subglobose to broadly ovoid, 2-3 mm long; perianth segments 2-4 mm long; plants usually less than 15 cm tall. ....
  - ..... 1b. *J. bufonius* var. *occidentalis*
2. Plants not over 1.5 cm tall, scapose, the flowers in a terminal, one-flowered head on a naked flowering stem; perianth segments 1.5-2 mm long; stamens 3 ..... 22. *J. bryoides*
1. Plants perennial, usually at least 1 dm tall; leaves often much more than 1 mm wide.
5. Inflorescence apparently lateral, the involucre bract terete, stiffly erect, appearing like a continuation of the stem; leaves all basal or nearly so, never septate.
6. Seeds tailed; flowers few (1-5); densely caespitose alpine plants without prolonged rootstocks; involucre bract rarely as much as 5 cm long.
  7. Uppermost leaf-sheath bristle-tipped, the blades reduced to a mere rudiment; capsule oblong, retuse.
    8. Mature capsule about equally or only slightly exceeding the perianth, the perianth mostly 6-7 mm long .....
      - ..... 11. *J. drummondii*
    8. Mature capsule usually at least 1 mm longer than the perianth, the perianth (4)5-6(8) mm long .....
      - ..... 11a. *J. drummondii* var. *subtriflorus*
  7. Uppermost leaf-sheath bearing a well developed blade, mostly 2-7 cm long.
    9. Capsule oblong, acute; perianth 6-9 mm long .....
      - ..... 12. *J. parryi*
    9. Capsule ovoid, retuse; perianth 4-5 mm long .....
      - ..... 13. *J. hallii*
6. Seeds not tailed; flowers several to many (6-20); plants with prolonged rootstocks, not often alpine; involucre bract usually more than 5 cm long.

10. Anthers mostly less than 1 mm long, from shorter to only slightly longer than the filaments.
11. Stamens 3 (occasionally 6); perianth 1.8-2.9 mm long; capsule slightly obovoid, distinctly triquetrous above; involucre bract rarely half as long as the stem.
12. Flowers small, the perianth segments 1.8-2.5 mm long, mostly somewhat spreading from the base, greenish to pale brown.
13. Inflorescence small, compact; culms rather stout, 1.5-4 mm in diameter at the top of the sheaths ..... 9. *J. effusus* var. *compactus*
13. Inflorescence much more open, loosely fastigiate; culms very slender, 1-1.5 mm in diameter at the top of the sheaths ..... 9a. *J. effusus* var. *exiguus*
12. Flowers larger, 2.5-2.9 mm long, rarely spreading, very dark brown, the perianth segments bordered by two dark brown lateral bands ..... 9b. *J. effusus* var. *brunneus*
11. Stamens 6; perianth often more than 3.5 mm long; capsule broadly ovoid to obovoid, not triquetrous; involucre bract from half as long as the stem to exceeding ..... 10. *J. filiformis*
10. Anthers 1.2-2.2 mm long, as least twice as long as the filaments.
14. Flowers inserted singly on the branches, each subtended by a pair of bractlets; capsule not heavily indurated, little if at all exceeding the perianth.
15. Upper leaf sheaths without blades; stems usually terete.
16. Stems up to 3 dm high, slender, about 1.5 mm in diameter at the base; inflorescence congested and usually subcapitate, generally about 1 cm long; perianth segments 4-5.5 mm long, scarious margined, subequal ..... 14. *J. balticus* var. *montanus*
16. Stems taller, often 6 dm high, stouter, 2-4 mm in diameter at the base; inflorescence diffuse, mostly 5-15 cm long; perianth segments 5-6 mm long, dark brown margined, the outer longer than the inner ..... 14a. *J. balticus* var. *vallicola*
15. Upper leaf sheaths usually bearing a well-developed blade; stems compressed, often twisted ..... 15. *J. mexicanus*
14. Flowers inserted in small headlike clusters, without bractlets but the clusters bracteate; capsule heavily indurated, much exceeding the perianth. (Arizona only.) ..... 16. *J. acutus* var. *sphaerocarpus*

5. Inflorescence obviously terminal, or if not the leaves septate and the involucre bract flat or channeled along the upper side, not strictly erect nor resembling a continuation of the stem.
17. Leaf blades not septate, transversely flattened (inserted with the flat surface facing the stem), involute or hollow.
18. Flowers borne singly on the branches of the inflorescence (not in heads), each with a pair of bracteoles at the base in addition to the bractlet at the base of the pedicel.
19. Outer perianth segments obtuse, with incurved or hooded tips, often of two colors; leaf sheaths extending halfway up the culm; rhizome horizontal, becoming slender and elongate.
20. Anthers scarcely longer than the filaments; capsule globose-obovoid, distinctly exserted ..... 2. *J. compressus*
20. Anthers about three times the length of the filaments; capsule ellipsoid-ovoid, equally or but slightly exceeding the perianth .... 3. *J. gerardii*
19. Outer perianth segments acute, uniformly colored (except for scarious margins), their tips ascending or spreading-ascending; leaf sheaths confined to the base or lower third of the plant; rhizomes short and erect, mostly hidden in the tussock of crowded crowns.
21. Capsule one-celled, with septa extending halfway to the center, acutish to obtuse, not retuse.
22. Auricles at the summit of the sheaths membranaceous, white and scarious, conspicuously produced beyond the point of insertion, 0.5-6 mm long; bracteoles blunt.
23. Leaves usually from half the length of the stems to much longer; auricles very thin, much longer (up to 6 mm) than broad; inflorescence open, generally more than 3 cm long; perianth often less than 4 mm long, the segments greenish ..... 4. *J. tenuis*
23. Leaves mostly less than half as long as the stems, stiffer; auricles membranaceous, generally less than 1 mm long; inflorescence usually congested, mostly less than 3 cm long; perianth usually no less than 4 mm long; the segments brownish with a broad, green midstripe ..... 4a. *J. tenuis* var. *congestus*
22. Auricles firm, not conspicuously produced beyond the point of insertion.
24. Auricles cartilaginous, yellow, very rigid and glossy, especially the short, produced portion; bracteoles blunt; sheaths of basal

- leaves stramineous or brown .....  
 ..... 4b. *J. tenuis* var. *dudleyi*
24. Auricles with the very slightly produced portion submembranaceous, not rigid, easily broken; bracteoles acuminate or aristate; sheaths of the basal leaves commonly purplish ..... 5. *J. interior*
21. Capsule completely three-celled.
25. Seeds apiculate, not caudate; leaves flat, but often involute or channeled.
26. Perianth segments 3.5-4 mm long, broadly scarious-margined to the blunt or short-pungent apex, fuscous with a broad greenish midstripe, subequal, little if at all exceeding the retuse capsule; flowers few, usually congested; leaves long and very narrow; stem slender .....  
 ..... 6. *J. confusus*
26. Perianth segments 4-5.5 mm long, the outer series not scarious-margined at the acuminate, long-pungent apex, greenish to stramineous, conspicuously exceeding the inner series and the obtuse to retuse capsule; flowers numerous in an open cyme; leaves shorter and broader (1-2 mm wide); stem stout ... 7. *J. brachyphyllus*
25. Seeds long-caudate; leaves terete, with a shallow groove above ..... 8. *J. vaseyi*
18. Flowers in heads, not bracteolate, having only the bractlet at the base of the pedicel.
27. Leaves flat.
28. Seeds tailed; ligule absent; auricles lacking or, when present, narrowly linear and less than 1 mm long ..... 18. *J. regelii*
28. Seeds not tailed; sheath margins generally united above to form a short, broad ligule; auricles when present broadly ovate.
29. Stamens 3; perianth 2-3.5 mm long.
30. Inner perianth segments ovate to oblong, blunt to mucronate; capsule dull, lusterless ..... 17. *J. marginatus*
30. Inner perianth segments lance-attenuate, subulate-tipped; capsule glossy .....  
 ..... 17a. *J. marginatus* var. *setosus*
29. Stamens 6; perianth 5-6 mm long (except in *J. covillei* var. *obtusatus*, where the length is 3-4 mm.)
31. Leaf sheath and blade rather sharply differentiated, the auricles evident.

- 32. Outer perianth segments exceeding or equaling the inner; leaf blades flat.
- 33. Vegetative parts smooth; auricles obtuse to truncate ..... 19. *J. longistylis*
- 33. Vegetative parts (especially leaf apices and pedicels) strongly scabrous ..... 19a. *J. longistylis* var. *scabratus*
- 32. Outer perianth segments distinctly shorter than the inner; leaf blades channeled ..... 20. *J. macrophyllus*
- 31. Leaf sheath passing gradually into the blade, the auricles lacking or poorly developed, especially in the basal leaves ... 21. *J. covillei* var. *obtusatus*
- 27. Leaves terete and hollow or deeply channeled or involute; seeds tailed.
- 34. Flowers 3-5 mm long; leaves about 1 mm in diameter; stems leafy only at the base; plants caespitose.
- 35. Capsule retuse; heads 1- 2-flowered; perianth dark brown to blackish; involucre bract foliaceous, erect ..... 23. *J. biglumis*
- 35. Capsule obtuse and mucronate; heads 2- 5-flowered; perianth pinkish-white to light chestnut-colored; involucre bract more or less membranaceous, divergent ..... 24. *J. albens*
- 34. Flowers 5-10 mm long; leaves about 2 mm in diameter; stems more or less leafy; plants stoloniferous ..... 25. *J. castaneus*
- 17. Leaf blades septate.
- 36. Leaf blades terete, the septa complete, mostly less than 3 mm wide.
- 37. Seeds tailed; stamens usually 3.
- 38. Heads numerous, small, 2- 5- flowered; perianth segments 1. 75-2. 5 mm long ..... \*26. *J. brachycephalus*
- 38. Heads 4-10, larger, 4- 8-flowered; perianth segments 3.5-4 mm long; often associated with hot springs ..... 27. *J. tweedyi*
- 37. Seeds usually apiculate but not tailed.
- 39. Stamens 3; plant caespitose .... 28. *J. acuminatus*
- 39. Stamens 6; plants often stoloniferous
- 40. Capsule subulate; flowers echinate-spreading.
- 41. Plant low, 1-4 dm high; perianth 3-4 mm long, the inner segments equaling or exceeding the outer; heads scarcely 10 mm

- broad; leaf blades erect or ascending . . . .  
 . . . . . 29. *J. nodosus*
41. Plant taller, 4-10 dm high; perianth  
 (4)4.5-5 mm long, the inner segments  
 shorter than the outer; heads 10-15 mm  
 broad; leaf blades abruptly divergent . . . .  
 . . . . . 30. *J. torreyi*
40. Capsule oblong to ovoid or obovoid; flowers  
 erect-ascending.
42. Perianth 2-3 mm long; capsule usually  
 exceeding the perianth.
43. Outer perianth segments acuminate,  
 equaling or shorter than the inner;  
 branches of the inflorescence mostly  
 spreading; capsule acute . . . . .  
 . . . . . 31. *J. articulatus*
43. Outer perianth segments blunt, longer  
 than the inner; branches of the  
 inflorescence stiffly erect; capsule distinctly  
 rounded at the apex . . . . .  
 . . . . . 32. *J. alpinus*
42. Perianth 3-5.5 mm long; capsule shorter  
 than or equaling the perianth.
44. Head solitary, or rarely two, more  
 than 12-flowered; perianth deep  
 brown; anthers rarely more than two-  
 thirds as long as the filaments; capsule  
 slightly obovoid, the valves  
 broadened above the middle and then  
 abruptly rounded to almost truncate,  
 the tip often slightly retuse; plants  
 mainly montane to alpine . . . . .  
 . . . . . 33. *J. mertensianus*
44. Heads (2)5-many, mostly with less  
 than 12 flowers; perianth from light  
 brown to dark purplish-brown; an-  
 thers more than two-thirds as long as  
 the filaments (usually exceeding  
 them); capsule and valves oblong or  
 nearly so, the valves gradually rounded  
 to acute at the tip; plants often of  
 the lowlands.
45. Perianth segments 3-5.5 mm  
 long; heads usually 5-30; anthers  
 usually much longer than the fila-  
 ments . . . . . 34. *J. nevadensis*
45. Perianth segments about 3 mm  
 long; heads 2-5; anthers only  
 slightly longer than the filaments  
 . . 34a. *J. nevadensis* var. *badius*

36. Leaf blades laterally flattened, equitant (one edge toward the stem), the septa incomplete (not extending all the way across the blade), mostly 3-6 mm wide.
46. Stamens 3; involucre bract ensiform, usually half the length of the inflorescence or more ..... 35. *J. ensifolius*
46. Stamens 6; involucre bract narrower, usually less than half the length of the inflorescence.
47. Perianth segments equal in length, very narrow and thin, usually slightly shorter than the oblong, acute capsule, spreading, overlapping only near the base, thus exposing about three-fourths of the capsule; blades of the larger leaves 7-12 mm wide; stems stout ..... 36. *J. xiphioides*
47. Perianth segments unequal, the inner ones shorter, segments broader and firmer in texture, usually exceeding the oblong-obovoid capsule, appressed, overlapping most of their length, thus exposing little of the capsule; blades of the larger leaves seldom more than 4 mm wide; stems relatively slender; valves of the capsule more rigid than in *J. xiphioides*.
48. Seeds tailed; style long-exserted ..... 37. *J. tracyi*
48. Seeds not tailed; styles usually little if at all exserted.
49. Heads few (seldom more than 10), many (15-25)-flowered, averaging 7-10 mm in diameter ..... 38. *J. saximontanus*
49. Heads numerous (usually more than 10), few (5-12)-flowered, averaging 5-6 mm in diameter ..... 38a. *J. saximontanus* f. *brunnescens*

## SPECIES DESCRIPTIONS

### 1. § POIOPHYLLI

#### 1. *Juncus bufonius* L.

Toad Rush

*Juncus bufonius* L., Sp. Pl. 328. 1753.

Polymorphic, tufted annual, branching from the base; *stems* low and slender, 3-30 cm high, often floriferous nearly to the base; *leaves* few, flat to involute, up to 1.5 mm wide, the sheaths from tapering into the blade, to truncate or rounded at the apex, their margins membranaceous; *cyme* open, often one-third to three-fourths of the entire plant; *flowers* remote, either single at the nodes or in twos or threes and more or less congested, 2-7 mm long, whitish, greenish or pale brown, subtended by two hyaline bracts 1-2 mm long; *perianth segments* lanceolate-acuminate or the inner obtuse, 2-7 mm long, broadly scarious-margined, the outer three longer than the inner; *stamens* usually 6, sometimes 3; *anthers* from very much shorter than to subequal to the filaments; *capsule* oblong to subglobose or broadly ovoid, 2-4.5 mm long, shorter than the perianth, obtuse, mucronate; *seeds* slenderly ovoid to ellipsoid, apiculate to abruptly truncate at each end, minutely reticulate, 0.3-0.5 mm long.

#### *Juncus bufonius* L., var. *bufonius*

Plants often over 15 cm high; *flowers* usually single at the nodes; *perianth segments* 4-7 mm long, plainly exceeding the capsule, the inner acuminate; *capsule* oblong to oblong-ovoid, 3-4.5 mm long; *seeds* apiculate.

Frequent to common in moist, open areas, especially around dried pools, river banks, etc., from low to mid-altitudes or occasionally sub-alpine. Cosmopolitan except in the tropics and extreme arctic.

#### Forage Value

Although a few collectors have reported the species as being of little value (in Sequoia National Forest, California, for example), it is generally claimed to be from good to excellent (Kootenai National Forest, Montana and Stanislaus National Forest, California) for all classes of stock.



**Plate 1. JUNCUS BUFONIUS**

(From Mason: Flora of the California Marshes)

**1a. *Juncus bufonius* var. *halophilus* Buch. & Fern.**

*Juncus bufonius* var. *halophilus* Buch. & Fern., Rhodora 6: 39. 1904.

Flowers often in twos and threes and more or less congested; inner perianth segments obtuse, barely exceeding the capsule; seeds abruptly truncate at the ends.

Rare to infrequent in our area, usually in brackish or saline habitats at low to mid-altitudes; common on the Atlantic Coast. Labrador and Quebec, southward to Massachusetts and New York; Saskatchewan to Nebraska and Colorado; Europe.

**1b. *Juncus bufonius* var. *occidentalis* F. J. Herm.**

*Juncus bufonius* var. *occidentalis* F. J. Herm., nom. et stat. nov.  
*J. sphaerocarpus* auct. Am., non Nees.

Plants usually less than 15 cm high; perianth segments 2-4 mm long; capsule subglobose to broadly ovoid, 2-3 mm long.

Occasional on mud flats, lake borders and other moist habitats; frequent in Arizona. Oregon and Idaho, southward to California, Colorado, and Arizona.

As pointed out by Hitchcock (in Hitchcock, Cronquist, Ownbey and Thompson, *Vascular Plants of the Pacific Northwest* 1: 191. 1969), this American plant that has been passing as *J. sphaerocarpus* Nees, of Europe, differs from it in its much narrower, unequal perianth segments that conspicuously exceed the capsule and in its lack of auriculate sheaths. Although transitional forms occur between var. *occidentalis* and var. *bufonius*, it does show a marked geographic segregation from typical *J. bufonius*, not occurring at all in eastern North America, and therefore merits varietal recognition.

**Forage Value**

Reports on this variety indicate that in nearly all areas of its occurrence it is highly palatable. In the Apache National Forest, Arizona, where it often forms a moss-like carpet below larger sedges, bluestem, clover and iris, it is annually almost exterminated by sheep.



**Plate 1b. JUNCUS BUFONIUS VAR. OCCIDENTALIS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)



## 2. *Juncus compressus* Jacq.

*Juncus compressus* Jacq., Enum. Stirp...Vindobon. 60 and 235. 1762.  
*J. bulbosus* L., Sp. Pl., ed. 2, 466. 1762, non ed. 1. 1753.

Tufted glaucous perennial; *rhizome* horizontal, seldom more than 5 cm long; *stems* curved, not stiffly erect, smooth, usually compressed throughout their length, 10-40 cm high, bearing 1-2 leaves; *leaves* narrowly linear, 0.75-1 mm wide, usually shorter than the stems, long-sheathed with obtuse auricles; *inflorescence* compound or decomposed, lax to compact, usually shorter than the lowest bract; *perianth segments* equal, 1.5-2 mm long, lanceolate-ovate, very obtuse, light brown with greenish center and membranaceous margins, the sepals with incurved tips; *stamens* 6, their anthers linear, slightly longer than the filaments; *style* shorter than the ovary; *capsule* subglobose, obtuse, about one and one-half times as long as the perianth, castaneous, very glossy; *seeds* 0.35-0.4 mm long, obliquely obovoid, apiculate.

Wet meadows and brackish marshes. Three collections are so far known from our area: marshy roadside ditch, 9 mi S. of Wisdom, Beaverhead County, Mont., Sept. 8, 1955, *F. J. Hermann 12484* (CA; MONT; US); open wet soil adjoining bait minnow ponds, C.S.U. Foothills Campus, Fort Collins, Larimer County, Colo., Oct. 10, 1967, *S. A. Flickinger 1* (CS), and, sedge meadow south of Spring Canyon, 5 mi SW. of Fort Collins, Larimer County, Colo., June 27, 1971, *F. J. Hermann 23841* (COLO; NY; USFS). Newfoundland, Nova Scotia, Prince Edward Island to eastern Ontario; almost certainly introduced in western United States and possibly also in the East. Widely distributed in Eurasia.

*Juncus gerardii* Loisel. in Desv., J. de Bot. 2: 284. 1809.

*J. fucensis* St. John, Rep. Prov. Mus. Nat. Hist. B.C. 1927: E14. 1928.

Closely resembling *J. compressus*. Tufted green perennial; *rhizomes* and slender stolons dark, elongate and horizontally spreading; *stems* stiffly ascending, scarcely flattened except below, 15-80 cm high, with 1-2 cauline leaves, 1-3 mm wide; *inflorescence* usually more lax with straighter less spreading branches than in *J. compressus*, usually exceeding the lowest bract; *perianth segments* equal, 2-3.5 mm long, dark brown to blackish with green central stripe, the sepals with incurved tips; *stamens* 6, their anthers about three times as long as the filaments; *style* equaling or exceeding the ovary; *capsule* ellipsoid-ovoid, mucronate, shorter than to barely exceeding the perianth; *seeds* obovoid, 0.4-0.6 mm long.

Salt marshes and alkaline flats. Known from three collections in our area: dominant on alkali flats, Beasley Reservoir, 6 mi NE. of Boulder, Boulder County, Colo., July 16, 1952, W. A. Weber 7787 (COLO); marshy roadside on US 56 about 2 mi S. of Barr Lake, Adams County, Colo., July 26, 1954, D. A. Spencer, s.n. (COLO); and, in *Carex* slough along Boulder Creek just W. of brick works, Valmont, Boulder County, Colo., July 12, 1970, W. A. Weber, s.n. (COLO). Newfoundland and Quebec southward along the coast to Florida, and locally inland to Indiana, Minnesota, Missouri, Colorado, and British Columbia; Eurasia and north Africa.



**Plate 3. JUNCUS GERARDII**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

#### 4. *Juncus tenuis* Willd.

Path Rush

*Juncus tenuis* Willd., Sp. Pl. 2: 214. 1799.

*J. macer* S. F. Gray, Natl. Arn. Brit. Pl. 2: 164. 1821.

Cespitose perennial; *stems* slender, 0.5-7 dm high, from bright green to pale green or drab; *leaves* chiefly basal, from less than one-half the length of to exceeding the culms, the blades flat, not septate, 0.5-1.5 mm wide, in drying often involute, the sheaths prolonged above into elongate-membranaceous to short-cartilaginous auricles; *lower bract* or bracts prolonged above the cyme; *cyme* 1-15 cm long, either compact or with unequal, ascending branches with 2-6 approximate flowers; bracteoles obtuse; *perianth segments* green or stramineous or tawny with green midrib, 3-5 mm long, acute to subulate, spreading-ascending, from equaling to much longer than the capsule; *stamens* 6, the anthers 0.6-0.8 mm long, shorter than the filaments; *style* very short; *capsule* oblong-ovoid, usually retuse, one-celled, the placentae extending only half way to the axis; *seeds* 0.3-0.4 mm long, obliquely ovoid-ellipsoid, minutely apiculate, obscurely reticulate.

An extremely variable taxon.

The seeds in *J. tenuis* and its near allies (Nos. 4 through 8) are covered with a mucilaginous coat which, after exposure to rain or dew, becomes very sticky. This no doubt contributes to dispersal of the seeds. When, however, they become wet before falling from the capsule, they will later be found glued together into a single hardened mass, firmly attached to the septa and inner walls of the capsule.

#### *Juncus tenuis* Willd., var. *tenuis*

*Juncus tenuis* var. *multicornis* E. Mey., Linnaea 3: 371. 1828.

Leaves usually half as long as the stems to much longer; *auricles* very thin, membranaceous, lanceolate-triangular to oblong, much longer (often over 5 mm) than broad, usually greenish to whitish; *inflorescence* open, generally more than 3 cm long; *perianth* often less than 4 mm long, the segments greenish.

Open, usually damp grassy places and bordering paths and trails. Occasional in the southern part of our range, more plentiful in Montana and Idaho; very common in eastern and central North America. Almost cosmopolitan.

#### Forage Value

Occasionally palatable and of fair value, but generally poor.

**4a. *Juncus tenuis* var. *congestus* Engelm.**

*Juncus tenuis* var. *congestus* Engelm., Trans. Acad. Sci. St. Louis 2: 450. 1866.

*J. tenuis* var. *occidentalis* Coville, Proc. Biol. Soc. Wash. 10: 129. 1896.

*J. occidentalis* (Coville) Wieg., Bull. Torrey Club 27: 521. 1900.

Leaves mostly less than half as long as the stems, stiffer; *auricles* membranaceous, mostly less than 1 mm long; *inflorescence* generally congested, mostly less than 3 cm long; *perianth* usually no less than 4 mm long, the segments brownish with a broad green central stripe.

More common in the Pacific States but extending eastward to Montana, Wyoming, and Utah.



**Plate 4. JUNCUS TENUIS**

**Plate 4a. JUNCUS TENUIS  
VAR. CONGESTUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

**4b. *Juncus tenuis* var. *dudleyi* (Wieg.) F. J. Herm.**

*Juncus tenuis* var. *dudleyi* (Wieg.) F. J. Herm., J. Arn. Arbor. 25: 56. 1944.

*J. dudleyi* Wieg., Bull. Torrey Club 27: 524. 1900.

Auricles short (mostly 0.5 mm long), indurated and cartilaginous, yellow to brown, glossy; *bracteoles* blunt to acute; *flowers* few, mostly congested into an inflorescence 1-5 cm long; *perianth* 4-6 mm long, widely spreading.

Although in its extreme form var. *dudleyi* is conspicuously distinct from var. *tenuis*, and most of the plants in eastern and central United States are of this extreme type, transitional forms become increasingly plentiful southwestward until they outnumber the extremes. Because of this it is highly impracticable to attempt to maintain var. *dudleyi* at specific level. In the Mississippi Valley, in particular, it also intergrades with *J. dichotomus*.

The name *J. tenuis* var. *uniflorus* (Farw.) Farw. has been proposed for this variety (Mich. Bot. 11: 34. 1972). Farwell, however, never made the transfer of his *J. interior* var. *uniflorus* (the type of which is an extremely depauperate, atypical specimen of var. *dudleyi*) to *J. tenuis*. The thesis that he intended to do so being based upon surmise only, under the International Rules of Botanical Nomenclature this name can have no standing. As pointed out by McVaugh, Cain and Hagenah (Cranbrook Inst. Sci. Bull. 34: 44. 1953), Farwell's "published papers do not indicate in any way that the names as published under *J. tenuis* are actually new combinations, and accordingly they must be treated as wholly new names, based on new types." The type collection designated by McVaugh *et al.* for Farwell's *J. tenuis* var. *uniflorus* is a mixture of var. *tenuis* and var. *dudleyi*.

Frequent to fairly common in moist places, mostly on plains and mesas. Newfoundland to British Columbia, southward to Tennessee, New Mexico, California, and northern Mexico.

**Forage Value**

As a rule somewhat more palatable than the typical variety, especially to cattle and horses, and occasionally up to 80 percent grazed.



**Plate 4b. JUNCUS TENUIS VAR. DUDLEYI**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 5. *Juncus interior* Wieg.

*Juncus interior* Wieg., Bull. Torrey Club 27: 516. 1900.

*J. arizonicus* Wieg., Bull. Torrey Club 27: 517. 1900.

*J. neomexicanus* Wieg., Bull. Torrey Club 30: 447. 1903.

*J. interior* var. *arizonicus* (Wieg.) F. J. Herm., J. Wash. Acad. Sci. 30: 217. 1940.

*J. interior* var. *neomexicanus* (Wieg.) F. J. Herm., J. Wash. Acad. Sci. 30: 217. 1940.

Cespitose perennial, very similar in habit to *J. tenuis*; leaves flat to involute, the pale brown to drab or purplish sheaths membranaceous-margined, occasionally somewhat cartilaginous below the summit, the submembranaceous to firm pale brown or drab auricles short, gradually rounded; inflorescence generally loose; bracteoles from lanceolate and acuminate to broadly ovate and acute or abruptly aristate; perianth mostly stramineous, from erect to spreading, 3-4 (3-5 in vars.) mm long, equaling or exceeding the capsule.

There is some question whether *J. interior* is actually specifically distinct because of strongly transitional forms between it and *J. dichotomus* in the Mississippi Valley and between it and *J. tenuis* var. *dudleyi* in other parts of its range.

Fairly common on moist open soil, especially on lake and pond margins, on plains and in the foothills; var. *arizonicus* (bracteoles lanceolate, acuminate; perianth segments erect, rigid, lanceolate-acuminate, with narrow, relatively opaque, hyaline margins) occurs in Arizona, and var. *neomexicanus* (bracteoles broadly ovate, acute to abruptly aristate; perianth segments spreading, not rigid, broadly ovate, acuminate, with broad transparent, scarious margins and brown lateral bands bordering the green center) occurs in Arizona, New Mexico, and Colorado. In typical *J. interior* the perianth is 3-4 mm long (4-5 mm in vars. *arizonicus* and *neomexicanus*) and equals the capsule, rather than exceeding it. Ohio and Indiana westward to Alberta, Wyoming, and Arizona.

### Forage Value

Reports vary, but generally considered to be fair to good for all classes of stock.



**Plate 5. JUNCUS INTERIOR**

## 6. *Juncus confusus* Coville

*Juncus confusus* Coville, Proc. Biol. Soc. Wash. 10: 127. 1896.

Sparingly tufted perennial; *stems* slender, 3-5 dm high; *leaves* basal, one-half to two-thirds the length of the stems, the channeled blades almost filiform, not septate, the auricles membranaceous, white, rounded, scarcely 1 mm long; *inflorescence* compact, rather few-flowered, 1-2 cm long, the lowest bract filiform, mostly several times as long as the inflorescence; *perianth segments* 3.5-4 mm long, ovate-lanceolate, acuminate, subequal, little if at all exceeding the capsule, fuscous with a broad greenish central stripe, broadly scarious-margined to the blunt or short-pungent apex; *stamens* 6, the anthers about 0.6 mm long, much shorter than the filaments; *capsule* broadly oblong, equaling to slightly shorter than the perianth, completely three-celled, triquetrous and retuse at the apex; *seeds* about 0.5 mm long, obliquely obovoid to broadly ellipsoid, short-apiculate at both ends, areolate, the longitudinal ridges generally prominent.

Common to very common in moist, grassy habitats, mostly at lower elevations. British Columbia and eastern Washington southward to California and Arizona.

### Forage Value

This appears to have the highest value, on the average, of any of the *J. tenuis* group, perhaps because it is much more plentiful, on the whole, than any of its near allies. Usually it is grazed considerably more by cattle and horses than by sheep, although in the Bridger National Forest, Wyoming, it is reported to have very high forage value for all types of stock. In North Park, Routt National Forest, Colorado, it is used extensively for hay.



**Plate 6. JUNCUS CONFUSUS**

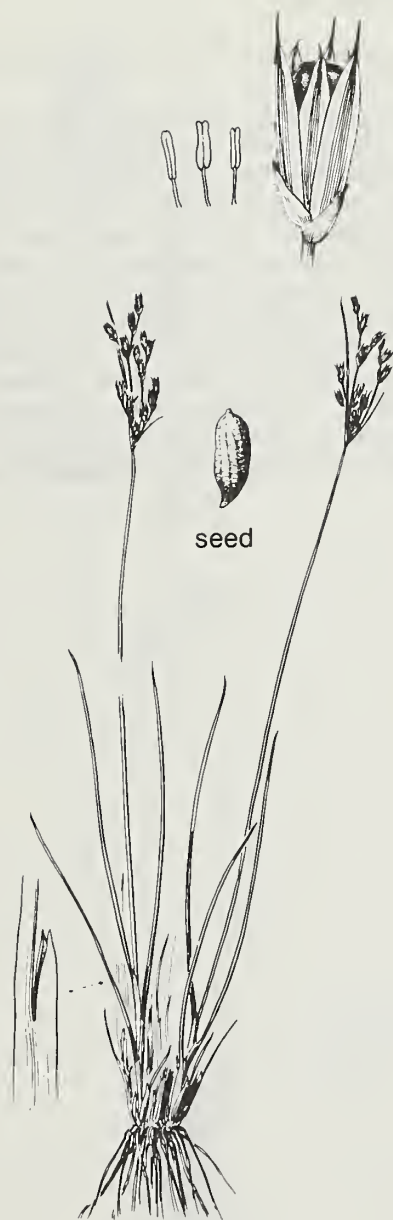
(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 7. *Juncus brachyphyllus* Wieg.

*Juncus brachyphyllus* Wieg., Bull. Torrey Club 27: 519. 1900.

Cespitose perennial; *stems* rather stout, 3-5 dm high; *leaves* basal, the blades short, flattened, 1-2 mm wide, one-fourth to one-third the length of the stem, the conspicuous auricles membranaceous; *inflorescence* 2-6 cm long, cymose, loosely many-flowered, usually somewhat exceeded by the involucre bract; *perianth* 4.5-5.5 mm long, the segments long-acuminate, pale greenish to straw-colored, the inner rather broadly scarious-margined, the outer longer and narrowly scarious-margined below the long-pungent apex, conspicuously exceeding the capsule; *stamens* 6, the anthers 0.5-0.8 mm long, shorter than the filaments; *capsule* narrowly oblong, firm, slightly triquetrous and obtuse to retuse at the apex, about equaling the inner perianth segments; *seeds* obliquely ellipsoid, about 0.5 mm long, very short-apiculate at each end, faintly areolate.

Infrequent to rare in moist habitats at lower elevations. Eastern Washington and Oregon, California, eastward to Idaho, New Mexico, Texas, and Arkansas.



**Plate 7. JUNCUS BRACHYPHYLLUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

8. *Juncus vaseyi* Engelm.

*Juncus vaseyi* Engelm., Trans. Acad. Sci. St. Louis 2: 448. 1866.

Densely tufted perennial; *stems* stiffly erect, 1.5-8 dm high; *leaves* basal, the blades nearly terete, very slightly channeled, not septate, about 1 mm wide, the auricles short (less than 1 mm long), rounded, membranaceous; *cyme* green or greenish, 15-40 mm long, the 15-50 flowers rather crowded, subtended by a stiff, erect bract 1-8 cm long; *perianth* 3.5-4.5 mm long, the segments greenish, rigid, subequal, the inner rather blunt with broad, scarious margins, the outer lanceolate, acute, appressed; *stamens* 6, the anthers (about 0.8 mm long) about equaling the filaments; *capsule* oblong-cylindric, obtuse, greenish, 4.5-6 mm long, exceeding the perianth, three-celled; *seeds* slenderly fusiform, 1-1.5 mm long, pale brown with white tails at each end almost as long as the body.

Rare to occasional on moist shores, thickets, etc. Quebec to British Columbia, southward to New York, Michigan, Illinois, Idaho, Utah, and Colorado.



**Plate 8. JUNCUS VASEYI**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 2. § GENUINI

### 9. *Juncus effusus* L. var. *compactus* Hoppe

*Juncus effusus* var. *compactus* Hoppe in Lejeune & Court., Comp. Fl. Belge 2: 23. 1831.

*J. bogotensis* var. *compactus* (Hoppe) Farw., Am. Midl. Nat. 10: 206. 1927.

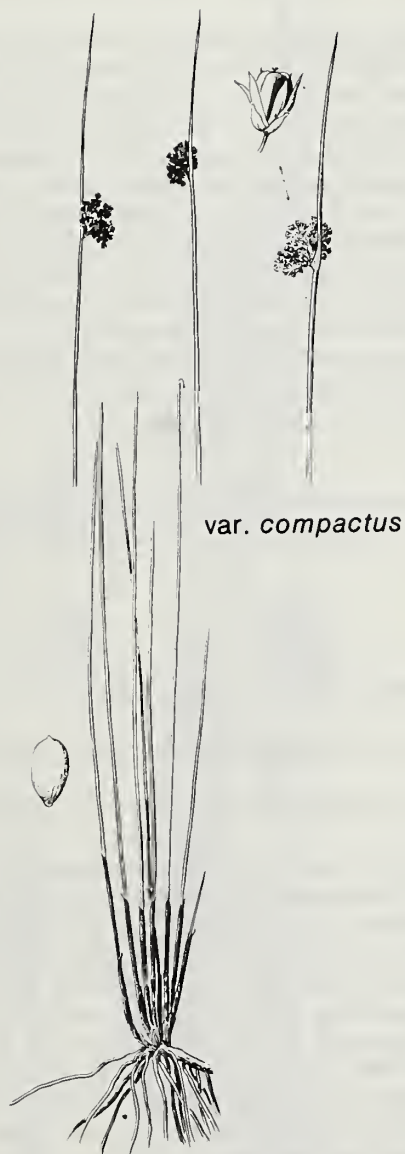
*J. effusus* var. *caeruleomontanus* St. John, Res. Stud. St. Coll. Wash. 2: 110. 1931.

*J. effusus* auct. Am., non L.

Stems densely tufted from stout, branching rhizomes, 4.5-12 dm high terete, usually firm, faintly many-striate, 1.5-4 mm in diameter at the top of the sheaths, which are bladeless or with a minute awnlike vestige of the blade, large and rather loose and dull, pale- or chocolate-brown below; *involucral bract* terete and resembling the stem, 7-20 cm long; *inflorescence* appearing lateral, small, compact and dense, 1-4.5 cm in diameter; *perianth segments* subequal, 1.8-2.5 mm long, soft, curved and wrinkled when dry, spreading from the base, the midrib broad and pale, with no conspicuous dark lateral bands, the margins broadly scarious; *stamens* 3 (rarely 6), opposite the outer segments, the anthers scarcely 1 mm long, equaling or shorter than the filaments; *capsule* more or less obovoid, olive-brown, rounded or slightly retuse and sometimes umbonate at the apex, about equaling the perianth; *seeds* broadly ellipsoid, about 0.4 mm long, apiculate and finely reticulate.

Seen only from two counties in Idaho: Benewah County (fairly common on stream bench, Santa Creek, 2,800 ft, Sept. 7, 1954, V. D. Moss 3 (USFS)), Boise County (wet soil, R. 5 E., T. 6 N., Idaho City, July 11, 1940, R. J. Davis 2781 (USFS)), and reported by Hitchcock (17) also from Clearwater County. The "*Juncus effusus* L." reported by Booth (2) as "found in swamps and moist places throughout" Montana may be this variety. Newfoundland to Ontario, southward to New York and West Virginia and westward to Michigan, Wisconsin; and (where it may have been introduced) Idaho and Washington; Europe. Several additional varieties occur in eastern North America and on the Pacific coast.

Typical *Juncus effusus* L. is principally a European taxon, being known in North America only from Newfoundland and Prince Edward Island. It and its numerous varieties form an extremely polymorphic complex.



**Plate 9. JUNCUS EFFUSUS VAR. COMPACTUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

**9a. *Juncus effusus* L. var. *exiguus* Fern. & Wieg.**

*Juncus effusus* var. *exiguus* Fern. & Weig., Rhodora 12: 87. 1910.

Slender densely tufted perennial, 4-6 dm high; *stems* firm and wiry in texture, finely striate, 1-1.5 mm in diameter at the top of the sheaths; *leaves* bladeless, the sheaths moderately firm, pale brownish-rufescent below, the uppermost 9-11 cm long, greenish toward the summit; *involucral bract* terete and appearing like a continuation of the stem, 4-10 cm long; *inflorescence* appearing lateral, loosely fastigate, 4-5.5 cm long; *perianth* very small (2 mm long), soft, wrinkled and curved when dry, the segments with greenish midrib or tinged with pale brown, bordered with pale brown bands and narrow, scarious margins; *stamens* 3, opposite the outer segments; *capsule* pale-olive-brown, not apiculate, about three-fourths the length of the perianth.

Seen only from southern Arizona: Pinal Peak, Gila County, 7,500 ft (*Smith 14066*) and Santa Catalina Mountains, Pima County (*Thornber 7518*). California to southern Arizona.

**Forage Value**

We have no reports from our area but in California its palatability is said to be low. Muskrats feed on the tender shoots and rootstocks extensively.

**9b. *Juncus effusus* L. var. *brunneus* Engelm.**

*Juncus effusus* var. *brunneus* Engelm., Trans. Acad. Sci. St. Louis 2: 491. 1868.

*J. effusus* var. *hesperius* Piper, Contrib. U.S. Natl. Herb. 11: 180. 1906.

Tall and rather slender, cespitose perennial, 5-10 dm high; *stems* rather stiff, inconspicuously many-striate, 1.2-2.4 mm in diameter at the top of the sheaths; *leaves* reduced to bladeless sheaths, these loose, membranaceous, reddish-brown at the base, the uppermost much paler and greenish-drab toward the summit, mostly 10-15 cm long; *involucral bract* terete, appearing like a continuation of the stem, 7-15 cm long; *inflorescence* appearing lateral, small (1-3 cm in diameter), varying from dense to rather loose; *perianth* 2.4-2.9 mm long, soft, wrinkled when dry, the segments with very slender greenish midrib bordered by dark brown bands and nearly obsolete scarious margins; *capsule* slightly longer than or about equaling the perianth.

This variety has been collected in Arizona near Baker Butte, Coconino County, 7,500 ft (*Darrow 3264*) and in the Rincon Mountains, Pima County, 7,500 ft (*Neally 158*). California to Arizona.



**Plate 9b. JUNCUS EFFUSUS VAR. BRUNNEUS**

(From Mason: Flora of the California Marshes)

10. *Juncus filiformis* L.

*Juncus filiformis* L., Sp. Pl. 326. 1753.

Stems arising, singly or in tufts, from creeping rhizomes, terete, filiform, rarely over 1 mm thick at the top of the sheaths, 0.5-6 dm high; *leaves* reduced to tight basal sheaths, the uppermost usually with a bristle-like vestige of a blade; *inflorescence* appearing lateral, the involucre bract terete, erect, sharp-pointed, from half as long as the stem to exceeding it; *cyme* few-flowered, with usually simple branches 0.2-2 cm long, or nearly capitate; *flowers* greenish, 3-4 mm long, the perianth segments lanceolate, subequal, mostly slightly exceeding the capsule; *stamens* 6, about half as long as the perianth, the anthers 0.4-0.6 mm long, much shorter than the filaments; *capsule* broadly ovoid to obovoid, firm, three-celled, barely pointed at the apex; *seeds* obliquely oblong-ellipsoid, 0.5 mm long, apiculate at each end, faintly reticulate.

Occasional to frequent on wet shores or in mountain meadows and marshes, from lowlands to about 9,000 ft elevation. Labrador to Alaska, southward to Maine, New York, uplands of Pennsylvania and West Virginia, Michigan, Minnesota, Colorado, Utah, and Oregon; Eurasia.



**Plate 10. JUNCUS FILIFORMIS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

**11. *Juncus drummondii* E. Mey.**

*Juncus drummondii* E. Mey in Ledeb., Fl. Ross. 4: 235. 1853.

Strongly tufted perennial; *stems* numerous, 1-3.5 dm high, terete, slender, from matted rootstocks; *basal sheaths* short, straw-colored, 2-6 cm long, bladeless or the inner tipped with a bristle-like blade, 2-10 mm long; *involucral bract* erect, sharp-pointed, appearing like a continuation of the culm, mostly 1.5-3 cm long; *flowers* 1-3 (rarely 4-5), rather closely aggregated, each subtended by two brownish, membranaceous bractlets; *perianth segments* lanceolate-attenuate, subequal, 5-7 mm long, green with broad, scarious, brown margins; *stamens* 6, little more than half the length of the perianth, their anthers much longer than the filaments; *capsule* oblong, three-celled, blunt and more or less retuse at the apex, about equaling the perianth; *seeds* narrowly obovoid, about 2 mm long, finely striate, long-caudate at each end.

Very common in most of our range on alpine tundra, in subalpine meadows, streambanks, talus slopes and ridges, but in Arizona known only from San Francisco Peaks (11,500 ft), Coconino County. Alaska to California, eastward to Alberta, western Montana and New Mexico.

**Forage Value**

Highly variable according to numerous reports, ranging from 10 percent to 80 percent, in some areas eaten readily by cattle and horses, very little by sheep and goats, in others 80 percent grazed by sheep. Since it is a long-persistent alpine species its palatability doubtless varies with the season and would be especially dependent upon the availability of other, more succulent fodder.



**Plate 11. JUNCUS DRUMMONDII**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)



**11a. *Juncus drummondii* var. *subtriflorus* (E. Mey.) C. L. Hitchc.**

*Juncus drummondii* var. *subtriflorus* (E. Mey.) C. L. Hitchc., Vasc. Plants Pac. NW. 1: 193. 1969.

*J. compressus* var. *subtriflorus* E. Mey., Linnaea 3: 368. 1828.

*J. subtriflorus* (E. Mey.) Coville, Contrib. U.S. Natl. Herb. 4: 208. 1893.

*J. drummondii* var. *longifructus* St. John, Proc. Biol. Soc. Wash. 44: 29. 1931.

*J. drummondii* var. *longifructus* f. *davisonii* St. John, Proc. Biol. Soc. Wash. 44: 30 1931.

*J. pauperculus* Schwarz in Fedde, Rep. Sp. Nov. 64: 26. 1961.

Differing from typical *J. drummondii* in having the mature capsule usually at least 1 mm longer than the perianth, and the perianth generally somewhat shorter (4-8, usually 5-6, mm long, compared to 6-7 mm in var. *drummondii*).

Reported from Idaho, and apparently occurring sporadically farther east; seen from Montana (Bitterroot Mountains, 7,200 ft, Missoula County, *Stickney & Lackschewitz* 3473 (USFS), and Colorado (Crown Point, 11,120 ft, Larimer County, *T. May* 135 (CS)).



**Plate 11a. JUNCUS DRUMMONDII VAR. SUBTRIFLORUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 12. *Juncus parryi* Engelm.

*Juncus parryi* Engelm., Trans. Acad. Sci. St. Louis 2: 446. 1866.

*J. drummondii* var. *parryi* (Engelm.) M. E. Jones, Bull. Univ. Mont. Biol. 15: 22. 1910.

Cespitose perennial; *stems* 1-3 dm high, slender, terete, from matted rootstocks; *basal sheaths* more or less brownish, mostly 1-4 cm long, the uppermost bearing a blade which is very slender, grooved at the base, terete above, 3-6 cm long, the lower sheaths bladeless or bearing a bristle-like blade less than 1 cm long, the auricles low, rounded, membranaceous; *involucral bract* terete, sharp-pointed, erect, appearing like a continuation of the stem, mostly 2-4 cm long; *flowers* 1-3, aggregated but inserted singly and subtended by two brownish, ovate, membranaceous bractlets; *perianth segments* 6-9 mm long, sometimes green in the center, mostly tinged with brown, with broad scarious margins, the outer lanceolate, acuminate, the inner slightly shorter and acute to rounded; *stamens* 6, the anthers about 1.5 mm long, much longer than the filaments; *capsule* usually slightly exceeding the perianth, narrowly oblong, acute; *seeds* narrowly ovoid, the body about 0.6 mm long, finely striate, long-tailed at each end.

Frequent to locally common in alpine and subalpine meadows, on streambanks and often on dry, rocky slopes. British Columbia southward to the Sierra Nevada, California, and eastward to the Rocky Mountains from southwestern Alberta and western Montana to Colorado.

We are informed by Mont E. Lewis that *J. parryi* is used as the main indicator species for identifying the *Abies lasiocarpa*/*Pinus albicaulis* habitat type.

### Forage Value

Averaging less than that for the generally more plentiful *J. drummondii*, being generally rated as poor to fairly good, rarely over 50 percent, although reported to be excellent for horses and sheep in the Payette National Forest, Idaho. Elk are said to relish it.



**Plate 12. JUNCUS PARRYI**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 13. *Juncus hallii* Engelm.

*Juncus hallii* Engelm., Trans. Acad. Sci. St. Louis 2: 446. 1866.

Cespitose perennial; *stems* 2-3 dm high, slender, terete; *leaves* basal and on the lower fifth of the stem, the lowest sheaths brownish, bladeless or with a bristle-like blade, the upper blades 5-15 cm long, terete, channelled; *involucral bract* terete, leaf-like, scarcely exceeding the inflorescence; *inflorescence* generally appearing lateral; *flowers* 2-7, closely cymose but obviously pedicellate, subtended by two ovate bractlets; *perianth segments* 4-5 mm long, acute, light brown, scarious-margined, the outer slightly longer than the inner; *stamens* 6, the anthers scarcely 1 mm long, about equaling the filaments; *capsule* oblong-ovoid, triquetrous, clearly retuse at the apex, three-celled, dark brown, equaling or slightly exceeding the perianth; *seeds* oblong-linear, about 1 mm long, finely striate, long-caudate at each end.

Rare or local in mountain meadows in the Rocky Mountains, from southern Montana to Colorado; montane to subalpine.

#### **Forage Value**

Fair to good for horses, so it may be of importance in the few areas where it is locally plentiful.



**Plate 13. JUNCUS HALLII**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

*Juncus balticus* var. *montanus* Engelm., Trans. Acad. Sci. St. Louis 2: 442. 1866.

*J. ater* Rydb., Fl. Rocky Mts. 151, 1060. 1917.

*J. arcticus* Willd. ssp. *ater* (Rydb.) Hultén, Kungl. Svenska Vet. Akad. Handl. IV, 8: 524. 1964.

*J. balticus* auct. Am., non Willd.

Rootstock stout, firm, long-creeping; *stems* in small tufts or scattered, slender, smooth, terete to somewhat flattened, mostly 1-3 dm high, about 1.5 mm in diameter at the base; *sheaths* basal, rather loose, straw-colored to brown, bladeless or sometimes with a filament-like rudiment; *involucral bract* terete, sharp-pointed, erect, appearing like a continuation of the culm, 3-20 cm long; *inflorescence* appearing lateral, congested and usually subcapitate, generally about 1 cm long; *perianth segments* 4-5.5 mm long, lanceolate, acute to short acuminate, with scarious margins, subequal, 3.5-5 mm long; *stamens* 6, the anthers 1.2-2.2 mm long, much longer than the filaments; *capsule* ovoid, acute, mucronulate, from nearly as long as to slightly longer than the perianth; *seeds* obliquely ovoid-ellipsoid, about 0.6 mm long, very finely striate-reticulate, minutely apiculate.

Very common (our most plentiful rush), especially along streams, lake-shores and on alkali flats, from the plains to the alpine zone. Alaska southward to California, Kansas, and Arizona.

*Juncus balticus* and its varieties comprise an extremely polymorphic complex. Typical *J. balticus* is Eurasian and, although a form occurring on the Pacific Coast from Alaska to California is probably referable to it, it does not otherwise occur in North America.

### Forage Value

In spite of the wiry texture of the plants, the varieties of *J. balticus* are, on the whole, among our most important forage plants. Reports on palatability vary enormously, from very low to excellent for all classes of stock, no doubt fluctuating with the season and presence or absence of other fodder. Certainly as forage its value is much higher when young and tender; on the other hand it is in many areas a very important component of the hay crop. The observations of Dr. Joseph Barrell (Flora of the Gunnison Basin, pp. 25-26) on the economic importance of *J. balticus* near Cathedral, Hinsdale County, Colorado, are very pertinent: "To see what the meadows southwest of Cathedral contained, I went one day to a field that had just been mowed, and walked back and forth, sampling the new-mown hay. My sampling showed that the two principal "grasses" (to use the names by which they are known among the ranchers) were June-grass (*Deschampsia caespitosa*) and wiregrass (*Juncus balticus*) . . . In passing, it might be of interest to observe (in evidence of the native quality of the meadows) that the ranchers with one accord value most

highly *Juncus balticus*. Although the cattle will not eat it in pasture, they will as hay; and the ranchers are agreed that it has no equal for protein content, or perhaps one should say, for protein-forming content. They all would like a greater concentration of it in their meadows, and would like to procure seed to achieve this end. It was here that I suggested that they take a hint from the growing of iris in gardens, plant small sections of root here and there, and let the plantings grow and merge into a pure stand."



**Plate 14. JUNCUS BALTICUS VAR. MONTANUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

**14a. *Juncus balticus* var. *vallicola* Rydb.**

*Juncus balticus* var. *vallicola* Rydb., Bull. Torrey Club 31: 399. 1904.  
*J. vallicola* (Rydb.) Rydb., Fl. Rocky Mts. 152, 1060. 1917.

Very similar to *J. balticus* var. *montanus*, but the stems taller, often to 6 dm high, and stouter, 2-4 mm in diameter at the base; the *inflorescence* diffuse and mostly 5-15 cm long; and the *perianth segments* 5-6 mm long, dark brown-margined, the outer acuminate and about 0.5 mm longer than the inner.

Frequent around lakes and bogs and in marshes, from the plains to submontane. Washington to California, eastward to Montana and Colorado. Transitional forms between this and var. *montanus* are frequent where their ranges overlap.



**Plate 14a. JUNCUS BALTICUS VAR. VALLICOLA**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)



### 15. *Juncus mexicanus* Willd.

*Juncus mexicanus* Willd., in Roem. & Schult., Syst. 7: 178. 1829.

*J. compressus* HBK., Nov. Gen. & Sp. 235. 1815, not Jacq. 1762.

*J. balticus* var. *mexicanus* (Willd.) Kuntze, Rev. Gen. Pl. 3: 320. 1893.

Perennial, mostly 2-6 dm high; *stems* little if at all tufted, from stout creeping rootstocks, slender, smooth, usually compressed and twisted; *leaves* basal, mostly reduced to bladeless, brown or straw-colored sheaths, but some with terete blades 5-20 cm long, the auricles short, rounded, somewhat cartilaginous; *involucral bract* 3-15 cm long, terete, erect, appearing like a continuation of the culm; *inflorescence* appearing lateral, 2-8 cm long, generally loosely 5- many-flowered; *perianth segments* greenish or straw-colored with broad, scarious margins, 4-5 mm long, lanceolate, acuminate, subequal; *stamens* 6, the anthers 1.4-1.6 mm long, much longer than the filaments; *capsule* ovoid, brown, mucronate, about as long as the perianth; *seeds* oblong-obovoid, irregularly reticulate.

In our area so far known only in Arizona, where it is frequent, especially on somewhat saline soils, from 3,000 to 7,000 ft, and Santa Fe County, New Mexico. California and Mexico, eastward to New Mexico and Texas.

### 3. § THALASSII

#### 16. *Juncus acutus* L. var. *sphaerocarpus* Engelm.

*Juncus acutus* var. *sphaerocarpus* Engelm., Rep. U.S. Geol. Surv. W. 100 Merid. 6: 376. 1878.

*J. acutus* auct. Am., non L.

Stout, rigid, densely cespitose perennial, 6-12 dm high; *stems* terete, pungent; *leaves* all basal, terete, nearly as long as the stems, the sheaths inflated, brownish, the auricles from scarcely developed to several mm high, cartilaginous; *involucral bract* foliose, stout, spinescent, 5-15 cm long; *inflorescence* paniculate, the branches very unequal, 5-20 cm long; *flowers* 2-4 in small clusters, without bracteoles; *perianth segments* 2-4 mm long, pale brown, glossy, indurate, the outer broadly lanceolate, obtuse to acutish, with a broad, scarious margin, the inner shorter, rounded to retuse at the scarious-margined apex; *stamens* 6, nearly equaling the perianth, the anthers 1.25-1.75 mm long, much longer than the filaments; *capsule* subglobose, obtuse, mucronate, about 5 mm long, the valves very rigid, much exceeding the perianth, *seeds* obliquely obovoid, acute to slightly tailed at each end, finely reticulate.

In our area known only from Arizona where it is occasional in saline habitats. Southern California, Baja California eastward to southern Nevada, Arizona, and Puebla, Mexico.

Typical *J. acutus* is European.



**Plate 16. JUNCUS ACUTUS VAR. SPHAEROCARPUS**

(From Mason: Flora of the California Marshes)

#### 4. § GRAMINIFOLII

##### 17. *Juncus marginatus* Rostk.

*Juncus marginatus* Rostk., Monog. Junc. 38, pl. 2, f. 3. 1801.

*J. marginatus* var. *paucicapitatus* Engelm., Trans. Acad. Sci. St. Louis 2: 455. 1866.

Cespitose perennial, from short, thick, often knotty rhizomes; *stems* slender, erect, more or less compressed, 1.5-7 dm high, 1-2.5 mm thick at the base; *leaves* flat, soft, the basal ones 0.4-2 dm long, 1-5 mm wide, the blades with three prominent veins, the sheaths with rounded, scarious auricles; *involucral bract* shorter than the inflorescence, often inconspicuous; *inflorescence* cymose, 1-10 cm long, open or somewhat compact, with 2-40 glomerules, 4-6 mm in diameter, of 2-12 flowers each, the glomerules subtended by lance-attenuate bracts; *perianth* 2-3.5 mm long, the reddish-brown outer segments sharply acute, slightly shorter than the ovate to oblong, blunt to mucronate inner segments, with green center separated from the hyaline margin by a brown band; *stamens* 3, slightly shorter than the outer perianth segments, the anthers reddish, much shorter than the filaments, quickly shriveling; *capsule* obovoid, thin-walled, rounded to truncate or retuse at the apex, beakless, almost three-celled, dull, lusterless, equaling the perianth; *seeds* oblong-ovoid, brown, 0.5 mm long, many-ribbed, apiculate at both ends.

Rare in swampy places on plains and in piedmont valleys in Colorado and Arizona. Nova Scotia and Maine, southward to Florida and westward to Michigan, Missouri, Texas, Colorado, Arizona, and California.



**Plate 17. JUNCUS MARGINATUS**



**17a. *Juncus marginatus* var. *setosus* Coville**

*Juncus marginatus* var. *setosus* Coville, Proc. Biol. Soc. Wash. 8: 124. 1893.

*J. setosus* (Coville) Small, Fl. SE. U.S. 258. 1903.

Very similar to var. *marginatus* except that the inner perianth segments are lance-attenuate and subulate-tipped and the capsule is glossy. Actually this is closer to the eastern *J. biflorus* Ell. in its glossy capsule and generally fewer-flowered heads but intermediates are so plentiful between var. *setosus*, var. *marginatus* and *J. biflorus* that, rather than proposing a transfer of var. *setosus* to varietal status under *J. biflorus*, it seems preferable to treat the latter as *J. marginatus* var. *biflorus* (Ell.) Engelm.

This is the commoner form in Arizona, the type specimen having come from the Santa Catalina Mountains (Pringle, June 4, 1882).



**Plate 17a. *JUNCUS MARGINATUS* VAR. *SETOSUS***

18. *Juncus regelii* Buch.

*Juncus regelii* Buch. in Engl., Bot. Jahrb. 12: 414. 1890.  
*J. jonesii* Rydb., Fl. Rocky Mts. 153 and 1061. 1917.

Perennial from stout, stoloniferous rootstocks; *stems* single or tufted, slender and somewhat flattened, 1-6 dm high; *leaves* equaling or exceeding the stems, the sheaths with narrow membranaceous margins, the auricles not developed or poorly so, the blades flat and grass-like, 10-15 cm long, 2-4 mm wide; *involucral bract* 1-4 cm long; *inflorescence* terminal, composed of 1-5 globose to hemispherical heads, 10-30-flowered, 8-20 mm in diameter; *perianth segments* 4-6 mm long, broadly lanceolate, papillose-roughened, dark brown with a broad greenish mid-stripe, the inner slightly shorter, broader, with a wider scarious margin, and more blunt; *stamens* 6, the anthers 1-1.5 mm long, about equaling the filaments; *capsule* oblong-ovoid, truncate to retuse, about equaling the perianth; *seeds* 1.2-1.8 mm long, narrowly ellipsoid, reticulate, long-tailed at both ends.

Occasional in mountain meadows and along wet trailsides in Montana, Idaho and Utah; a single collection seen from Wyoming (Tower Falls, Yellowstone National Park, *H. S. Conard 1705* (RM)); montane to subalpine. Southern British Columbia southward to northern California, and eastward to Montana, Utah, and Wyoming.



**Plate 18. JUNCUS REGELII**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 19. *Juncus longistylis* Torr.

*Juncus longistylis* Torr., Bot. Mex. Bound. 223. 1859.

Loosely tufted, rhizomatous perennial; *stems* slender, somewhat compressed, 2-6 dm high; *leaves* mostly basal (the cauline 1-3), one-third to one-half the length of the stem, the sheaths with distinct, obtuse to truncate auricles (except in var. *scabratus*) 0.5-2 mm long, the blades grass-like, dorsiventrally flattened, 1-3 mm wide; *involucral bract* membranaceous, 1-2 cm long; *heads* 1-8, discrete or more or less aggregated, 3-12-flowered; *perianth segments* mostly 5-6 mm long, broadly lanceolate, smooth or minutely roughened, brown with a broad greenish mid-stripe and broad scarious, whitish margins, the inner slightly longer than the outer; *stamens* 6, the anthers 1.2-2 mm long, usually much longer than the filaments; *capsule* oblong, rounded to truncate and often retuse, slightly shorter than the perianth; *seeds* obliquely oblong, 0.4-0.5 mm long, conspicuously striate, slightly apiculate at each end.

Frequent to occasional in moist habitats; montane to submontane. British Columbia southward to California and northern Arizona and eastward to Ontario, Nebraska, Colorado, and New Mexico.

### Forage Value

From good to very good for cattle and horses, apparently much less for sheep as a rule, but often reported as very palatable to all classes of stock.

## 19a. *Juncus longistylis* var. *scabratus* F. J. Herm.

*Juncus longistylis* var. *scabratus* F. J. Herm., J. Wash. Acad. Sci. 30: 218. 1940.

Similar to var. *longistylis* except in having the vegetative parts, particularly the apices of the leaves and the pedicels, strongly scabrous and the auricles tending to be prolonged, free and acute.

Known only from Arizona, where it is the commoner form, especially in the southern half of the State.



**Plate 19. JUNCUS LONGISTYLIS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 20. *Juncus macrophyllus* Coville

*Juncus macrophyllus* Coville, Univ. Calif. Publ. Bot. 1: 65. 1902.

*J. canaliculatus* Engelm., Bot. Gaz. 7: 6. 1882, not Liebm. 1850.

Cespitose perennial; *stems* 2-9 dm high, rather stiff, subterete but somewhat compressed; *leaves* pale green, somewhat channeled, the basal striate, from equaling to about half the length of the stems, 1.5-3 mm wide, the cauline 1-3, their blades flat but rather thick and pungent, mostly 8-15 cm long, the sheaths scarious-margined with auricles 1.5-3 mm long; *inflorescence* loosely paniculate, the heads 8-25, 3- 5-flowered; *perianth segments* green, with brownish or reddish tinge, ovate, acute to obtuse, hyaline-margined, 5-6 mm long, the outer distinctly shorter than the inner; *stamens* 6, half the length of the segments, the anthers much longer than the filaments; *capsule* short-obovoid, with a short beak, much shorter than the perianth; *seeds* obliquely obovoid, about 0.5 mm long and about 20-ribbed, the reticulations lineolate.

Known in our area only from Arizona (Yavapai, Maricopa and Pinal Counties), where it is rare on damp slopes below 5,500 ft. Southern California to Arizona, and Baja California.



**Plate 20. JUNCUS MACROPHYLLUS**

21. *Juncus covillei* Piper var. *obtusatus* (Engelm.) C. L. Hitchc.

*Juncus covillei* var. *obtusatus* (Engelm.) C. L. Hitchc., in Hitchcock *et al.*, Vasc. Plants Pac. NW. 1: 193. 1969.

*J. obtusatus* Engelm., Trans. Acad. Sci. St. Louis 2: 495. 1868, not Kit. 1863.

Cespitose perennial from creeping rootstocks; *stems* 0.5-2.5 dm high, slightly flattened; *leaves* grass-like, mostly basal, flat, 2-3 mm wide, the junction of the sheath and the blade inconspicuous, usually without auricles, about equaling the stems, cauline leaves 1-2, or sometimes none; *inflorescence* paniculate, of 1-6(8) heads, mostly 3- 7-flowered, the bracts and peduncles roughened; *perianth segments* 3-4 mm long, subequal, ovate-oblong, pale brown, broadly scarious-margined, the center minutely papillate-roughened, the outer rounded to acute and short-mucronate, the inner usually obtuse or acutish; *stamens* 6, the anthers 0.9-1.4 mm long, usually slightly longer than the filaments; *capsule* oblong-ovoid, pale brown, obtuse and usually retuse at the apex, only slightly longer than the perianth; *seeds* obliquely cylindric-ovoid, somewhat truncate, faintly reticulate, minutely apiculate at each end.

So far known in our area from only a single collection: steep northeast slope, finger-ridge of Boulder Peak above Nelson Lake, 8,100 ft, Bitter-root Mountains, Ravalli County, Mont., Aug. 1, 1971, *K. H. Lackschewitz* 3123 (USFS). Washington to California, eastward to Idaho and western Montana.



*var. obtusatus*



seed



**Plate 21. JUNCUS COVILLEI VAR. OBTUSATUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)



22. *Juncus bryoides* F. J. Herm.

*Juncus bryoides* F. J. Herm., Leafl. West. Bot. 7: 117. 1948.

*J. trifloris* var. *uniflorus* Engelm., Trans. Acad. Sci. St. Louis 2: 493. 1868, in part.

Diminutive annual, 5-15 mm high; *leaves* 1.5-4 mm long, one-third the length of the peduncles or less, the sheaths 0.5-1.5 mm long very broadly hyaline margined, irregular and variable, generally as wide as long, more or less equaling the triquetrous to setaceous-canaliculate blades; *peduncles* 1-25, erect or ascending, filiform; *head* 0.75-1.25 mm wide, one-flowered; *bracts* 2 (occasionally only one), from 0.5-0.9 mm long, ovate to lanceolate, blunt to acuminate, hyaline, generally appressed, sometimes ascending to spreading, sessile to slightly clasping; *perianth* closely appressed to the capsule, tulip-like in appearance, the tips of the perianth segments incurved so that the capsule is usually nearly surrounded; *perianth segments* 1.5-2 mm long, the outer slightly exceeding the inner, about 0.5 mm wide, elliptic-oblong, abruptly acuminate, very thin and broadly hyaline-margined, the midrib and center wine-red, darker toward the tip; *stamens* 3, 0.4-0.7 mm long, the anthers (0.1-0.2 mm) shorter than the filaments (0.3-0.5 mm); *capsule* elliptic-oblong to almost spherical, 1.25-2 mm long, from three-fourths the length of to almost equaling the perianth, brownish-red, the apex obtuse; *seeds* turbinate, 0.35-0.40 mm long, smooth, minutely apiculate.

Known in our area from two collections only: boggy place midway between Salt Lake City and Park City, Wasatch Mountains, Utah, about 7,000 ft, July 2, 1908, *I. D. Cardiff* (NY); and, spring-fed sandstone ledges, Douglas Mt., 7,500 ft, Whisky Springs Ranch, 4 mi above Grey-stone on Zenobia Peak Road, Moffat County, Colo., June 25, 1965, *W. A. Weber 12561* (COLO; CS; US; USFS). California (where occasional to frequent), Utah and Colorado.



Plate 22. *JUNCUS BRYOIDES*

## 5. § ALPINI

### 23. *Juncus biglumis* L.

*Juncus biglumis* L., Sp. Pl. 328. 1753.

Loosely tufted, very slender perennial; *stems* erect, 2.5-10(15) cm high, nearly terete; *leaves* 1-5, basal, shorter than the stem, the sheaths prolonged into short, inconspicuous auricles, the blades erect or ascending, 2-7 cm long, about 1 mm thick, terete or nearly so (imperfectly septate, the septa not externally evident); *involucral bract* foliaceous, erect, green with brown margins to blackish-purple, usually exceeding the inflorescence; *inflorescence* a single head of 1-2 (rarely 3 or 4) flowers; *perianth segments* 3 mm long, subequal, oblong, obtuse, from brown to blackish-purple; *stamens* equaling the perianth, the anthers shorter than the filiform filaments; *capsule* trigono-cylindric, retuse, imperfectly three-celled, exceeding the perianth, generally pale with dark-purplish valve margins; *seeds* about 1 mm long, fusiform-ovoid, short-caudate at each end.

Rare in wet gravel and open, rocky slopes in the alpine zone, in Colorado, Wyoming, and Montana. Greenland to Alaska, southward to British Columbia, Alberta, Montana, and Colorado; Eurasia.



**Plate 23. JUNCUS BIGLUMIS**

24. *Juncus albescens* (Lange) Fern.

*Juncus albescens* (Lange) Fern., Rhodora 26: 202. 1924.

*J. triglumis* var. *albescens* Lange, Conspect. Fl. Groenl. 123. 1880.

*J. triglumis* auct. Am., not L.

Densely caespitose perennial; *stems* terete, filiform, erect, 3-15(25) cm high; *leaves* basal, 2-10 cm long, filiform, usually less than half the length of the stems, the sheaths greenish-brown, auriculate, the blades filiform, terete, (imperfectly septate, the septa not externally evident), with blunt callous tips; *involucral bracts* (2) brownish, divergent, the lowest about equaling or slightly exceeding the inflorescence, spathiform, obtuse; *inflorescence* of a single 2- 3(5)-flowered head; *perianth segments* 3-5 mm long, oblong-lanceolate, obtuse, subequal, 3-5 mm long, pale brown, whitish or pink-tinged; *stamens* 6, from subequaling the perianth to as much as 1.5 mm shorter, the anthers 0.6-1 mm long, much shorter than the filaments; *capsule* trigonous-cylindric, obtuse, mucronate, about equaling the perianth; *seeds* oblong-fusiform, 1.3-1.7 mm long, the papery covering reticulate, the broad-based white tails shorter than the body.

Rare to frequent or locally fairly common in boggy alpine areas, in Montana, Idaho, Utah, and Colorado. Greenland to Alaska, southward to Quebec, Montana, Utah, and Colorado.



**Plate 24. JUNCUS ALBESCENS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

25. *Juncus castaneus* J. E. Smith

*Juncus castaneus* J. E. Smith, Fl. Brit. 1: 383. 1800.

Strongly stoloniferous perennial; *stems* 1-3(4) dm high, solitary, stiff, erect, leafy; *leaves* erect, (imperfectly septate, the septa not externally evident), the outer sheaths short, loose, the inner clasping, not auriculate, their blades tapering from an involute-tubular base to a slender, channeled, acutish apex; *lower involucral bract* leaf-like, from equaling to much overtopping the inflorescence; *inflorescence* strict, the heads 1-3 (rarely more), usually aggregated, 2- 12-flowered; *perianth segments* dark brown, in anthesis about 5-6 mm long, becoming 6-10 mm long with the fruit, the outer linear-lanceolate, acute, usually slightly exceeding the narrow, obtuse inner series; *stamens* 6, equaling the perianth, the anthers about 1 mm long, shorter than the filaments; *capsule* castaneous to purple-black, narrowly oblong, tapering to an acute apex, imperfectly three-celled, conspicuously exserted; *seeds* very slenderly fusiform, 2.5-4 mm long, contracted at each end into a tail two to three times the length of the body.

Occasional to frequent in subalpine and alpine bogs and meadows, on streamsides and alpine slopes. Greenland to Alaska, southward to Labrador, Manitoba, Colorado, Utah, and New Mexico; Eurasia.



**Plate 25. JUNCUS CASTANEUS**

(from Hitchcock et al., Vascular Plants of the Pacific Northwest)

## 6. § SEPTATI

### \*26. *Juncus brachycephalus* (Engelm.) Buch.

*Juncus brachycephalus* (Engelm.) Buch. in Engler, Bot. Jahr. 12: 268. 1890.

*J. canadensis* var. *brachycephalus* Engelm., Trans. Acad. Sci. St. Louis 2: 474. 1868.

Densely caespitose perennial; *stems* slender, 2.5-7 dm high, erect or sometimes reclining and rooting at the nodes, 2- 4-leaved; *leaves* all with well-developed blades, these terete and septate, usually 1-2 mm in diameter; *involucral bract* foliose; *inflorescence* a large (0.5-2.5 dm long), spreading, open or diffuse cyme, the heads numerous, small, 2-5-flowered; *perianth segments* greenish to light brown or reddish with hyaline margins, 1.75-2.5 mm long, much shorter than the capsule, the outer series shorter than the inner, lanceolate with obtuse to acute apex; *stamens* usually 3, but frequently 6, the number often varying in the same plant, the anthers much shorter than the filaments; *capsule* reddish-brown, prismatic, 2.4-3.8 mm long, abruptly narrowed into a short beak; *seeds* ellipsoid, 20- 30-ribbed, reticulate, caudate, 0.8-1.2 mm long, the body comprising about three-fifths of their length.

A species of shores (often calcareous), marshes and wet meadows in the eastern and midwestern states, known in our area only from El Paso County, Colo., where it may have been introduced: edge of small stream, Shaw Ranch, 4½ mi S. of Peyton, Aug. 22, 1946, *R. B. Livingston 1431* (CS); also reported from Black Forest, about 16 mi NNE. of Colorado Springs. Maine to northern Ontario and Minnesota, southward to Maryland, Ohio, and Indiana; sporadic and probably introduced, farther west.

\*See addendum, page 100.



**Plate 26. JUNCUS BRACHYCEPHALUS**

27. *Juncus tweedyi* Rydb.

*Juncus tweedyi* Rydb., Mem. N.Y. Bot. Gard. 1: 90. 1900.

*J. canadensis* var. *coarctatus* Coult., Man. Bot. R. M. Reg. 358. 1885, not Engelm. 1866.

*J. canadensis* var. *kuntzei* Buch. in Engler, Bot. Jahr. 12: 272. 1890.

*J. kuntzei* Buch. ex Vierhapper., Engl. & Prantl, Nat. Pflanzenf., ed. 2, 15a: 218. 1930.

Cespitose perennial; *stems* 2-3.5 dm high, 2-3 mm in diameter, leafy to near the top; *lowest sheaths* bladeless, or with the blade reduced to a bristle, pale purplish-brown; *upper sheaths* with membranaceous, truncate auricles up to 3 mm long, the blades up to 12 cm long, terete or slightly flattened, septate; *involucral bract* usually shorter than the inflorescence; *inflorescence* of 4-10 heads (these 4- 8-flowered) in a contracted panicle, 1-5 cm long; *perianth segments* 3.5-4 mm long, subequal, narrowly lanceolate-acuminate, light brown to straw-colored; *stamens* 3, the anthers about 0.5 mm long, shorter than the filaments; *capsule* dark brown, oblong, acute, exceeding the perianth; *seeds* fusiform, 0.7-1 mm long, finely reticulate, very shortly apiculate-caudate at each end.

Very local in montane bogs, about springs and on river and lake margins. In Wyoming, where it is known only from Yellowstone National Park, it is apparently confined to the immediate vicinity of hot mineral springs and streams where it is often associated with *Panicum thermale*. South-central Montana, Idaho, Wyoming, and Utah.



**Plate 27. JUNCUS TWEEDYI**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

**28. *Juncus acuminatus* Michx.**

*Juncus acuminatus* Michx., Fl. Bor. Am. 1: 192. 1803.

*J. bolanderi* var. *riparius* Jeps., Fl. Calif., 1: 255. 1921.

*J. acuminatus* f. *sphaerocephalus* F. J. Herm., Leafl. West. Bot. 8: 13. 1956.

Cespitose perennial from short, inconspicuous rootstocks; *stems* erect, slender, 3-10 dm high; *leaves* 1-3 on a stem, the sheaths with rounded auricles 1.5-5 mm long, the blades semi-terete, conspicuously septate, the lower 1-3 dm long, 1-2 mm thick, the upper reduced; *involucral bract* shorter than the inflorescence; *inflorescence* paniculate, 5-15 cm long, loose, with generally 5-50 heads (sometimes reduced to 1) on spreading branches, the heads 5-10 mm wide, usually 5- 20-flowered; *perianth segments* light brown to greenish, 3-3.5 mm long, subequal, narrowly acuminate to subulate, equaling the capsule; *stamens* 3 (occasionally 6), about half as long as the perianth, the anthers about 0.7 mm long, shorter than the filaments; *style* almost none; *capsule* narrowly ovoid-prismatic, tapering to the mucronate apex, one-celled, light brown or straw-colored; *seeds* oblong-ellipsoid, 0.3-0.4 mm long, finely reticulate, minutely apiculate at each end.

In our area seen only from Arizona, where it is occasional on stream banks, lake margins and in wet meadows, and locally common in the Santa Catalina and Rincon Mountains (Pima County) at 3,000 to 6,500 ft., and from a single locality in Colorado (drying shore of Baseline Lake, 5,300 ft., Boulder County, *W. A. Weber 7970 and 8953*). Maine to British Columbia, southward to Georgia, Arizona, Oregon, and California.

*J. acuminatus* f. *sphaerocephalus* is a variant in which the heads are few, many-flowered and spherical rather than hemispherical.



**Plate 28. JUNCUS ACUMINATUS**  
(From Mason: Flora of the California Marshes)

## 29. *Juncus nodosus* L.

*Juncus nodosus* L., Sp. Pl., ed. 2, 466. 1762.

Perennial from creeping, thread-like, tuber-bearing rhizomes; *stems* slender, solitary, 1-4(5.5) dm high, with mostly 2-3 slender leaves; *leaves* erect, the sheaths projecting as small, rounded auricles about 1 mm long, the blades terete, septate, about 1 mm thick, the uppermost one and the involucre bract usually exceeding the inflorescence; *inflorescence* seldom exceeding 5 or 6 cm, bearing 3-15, many (6- 30)-flowered, spherical heads, 7-12 mm in diameter; *perianth segments* 3-4 mm long, greenish-brown to tawny, narrowly lanceolate and subulate-acuminate, but the tips not rigid, somewhat shorter than the capsule, the inner series equaling or very slightly exceeding the outer; *stamens* 6, about half as long as the perianth, the anthers 0.6-0.8 mm long, slightly shorter than the filaments; *capsule* prismatic-conic, one-celled, tapering from near the base into a long, non-dehiscent beak exceeding the perianth; *seeds* oblong to obovoid, 0.5 mm long, very finely reticulate, abruptly mucronate.

Occasional to frequent in moist to wet open habitats, especially pond margins and ditches, generally below 8,000 ft. Newfoundland to Alaska, southward to Virginia, New Mexico, and California.

### Forage Value

Generally reported as good, averaging 60 percent to 80 percent grazed by horses and cattle.



**Plate 29. JUNCUS NODOSUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 30. *Juncus torreyi* Coville

*Juncus torreyi* Coville, Bull. Torrey Club 22: 303. 1895.

*J. nodosus* var. *megacephalus* (Wood) Torrey, Fl. N.Y. 2: 326. 1843.

*J. megacephalus* Wood, Class-book, ed. 2, 724. 1861, not Curtis 1837.

Perennial from slender, creeping rhizomes, tuberous at the nodes; *stems* stout, solitary, (3)4-10 dm high; *leaves* 1-4 on the stem, the sheaths projecting into rounded auricles 1-3.5 mm long, the blades stout, 2-5 mm thick, terete, septate, abruptly divergent from the stem, the uppermost and the involucral bract usually equaling or exceeding the inflorescence; *inflorescence* congested, consisting of 1-20 spherical heads, 30-80-flowered, 10-15 mm in diameter; *perianth segments* greenish-brown to tawny, (4)4.5-5 mm long, narrowly lanceolate and acuminate-subulate, the tips rigid, the outer generally somewhat longer than the inner; *stamens* 6, about half as long as the perianth, the anthers scarcely 1 mm long, shorter than the filaments; *capsule* narrowly prismatic-conic, tapering from near the base into a long, non-dehiscent beak usually equaling or slightly exceeding the perianth; *seeds* oblong-ellipsoid, about 0.4 mm long, finely reticulate, minutely apiculate at each end.

Frequent in moist to wet open habitats, mostly below 8,000 ft. Somewhat more southern in its distribution than *J. nodosus* and more frequent in our area. Massachusetts to Washington, southward to Alabama, Texas, Arizona, California and northern Mexico.

The relatively huge, leafy, grotesque heads often produced by a gall insect in many species of §Septati occur with greatest frequency in this species, in *J. nodosus* and *J. acuminatus*, but the parasite appears to be much more common farther east.

#### Forage Value

Although reported to be eaten by all classes of stock, *J. torreyi* is less palatable than *J. nodosus* so is generally rated as only fair.



**Plate 30. JUNCUS TORREYI**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 31. *Juncus articulatus* L.

*Juncus articulatus* L., Sp. Pl. 327. 1753.

*J. articulatus* var. *obtusatus* Engelm., Trans. Acad. Sci. St. Louis 2: 497. 1868.

Loosely caespitose perennial from branching rootstocks; *stems* erect or ascending, often rooting at the lower nodes, 1-6 dm high; *leaves* 1-3 on the stem, the loose sheaths with rounded auricles 1-1.5 mm long, the blades terete, septate, 5-10 cm long; *involucral bract* shorter than the inflorescence; *inflorescence* 2-15 cm high, with divaricate branches, the heads numerous, small, turbinate to hemispherical, 3- 12-flowered; *perianth segments* brown or greenish, 2-3 mm long, lanceolate, acute or acuminate, subequal; *stamens* 6, shorter than the perianth, the anthers shorter than the filaments; *capsule* dark brown, exceeding the perianth, three-angled, tapering to a conspicuous tip, one-celled; *seeds* oblong to obovoid, 0.5 mm long, very lightly striate longitudinally, minutely apiculate at each end.

Wet ground. Known sparingly from Arizona, Colorado, Utah, and Idaho. Newfoundland to British Columbia, southward to Maryland, West Virginia, northern Indiana, Minnesota, Utah, Arizona, and Idaho; Eurasia.



**Plate 31. JUNCUS ARTICULATUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 32. *Juncus alpinus* Vill.

*Juncus alpinus* Vill., Hist. Pl. Dauphiné 2: 233. 1787.

*J. richardsonianus* Schultes in Roem. & Schult., Syst. 7: 201. 1829.

Cespitose perennial from short-creeping rhizomes; *stems* erect or slightly decumbent, sometimes rooting at the nodes, 1-4 dm high; *leaves* 1-3 on the stem, auriculate, the blades terete, septate; *involucral bract* usually shorter than the inflorescence; *inflorescence* 2-15 cm long, the branches rather strictly ascending, the heads usually 4-30, mostly 3-10-flowered, the flowers sessile or equally short-pedicelled; *perianth segments* pale to deep purplish-brown, 2-2.5 mm long, the inner usually slightly shorter than the outer, obtuse, the outer oblong, acute or mucronate; *stamens* 6, one-half to two-thirds as long as the perianth, the anthers shorter than the filaments; *capsule* ovoid-oblong, incompletely three-celled, as long as or slightly exceeding the perianth, straw-colored or brown, obtuse or short-pointed at the apex; *seeds* fusiform, about 0.5 mm long, very lightly striate longitudinally, minutely apiculate at each end.

Occasional in wet, often calcareous, montane to subalpine habitats in Colorado, becoming infrequent in Wyoming and Utah and frequent farther north. Newfoundland to Alaska, southward to Quebec, Minnesota, Colorado, Utah, and Washington; Eurasia. A polymorphic species, in the eastern and midwestern States represented by var. *rariflorus* Hartm. and var. *fuscescens* Fern., which seem not to extend to our area.



**Plate 32. JUNCUS ALPINUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 33. *Juncus mertensianus* Bong.

*Juncus mertensianus* Bong., Mém. Acad. St. Pétersb. VI, 2: 167. 1833.

Cespitose perennial from short, matted rootstocks; *stems* slender and weak, somewhat flattened, 1-4 dm high; *leaves* 1-4 on a stem, laterally compressed, obscurely septate, 5-12 cm long, 0.5-1.5 mm wide, the sheaths projecting into rounded, opaque, membranaceous auricles 1-2 mm long; *involucral bract* from shorter to longer than the inflorescence; *heads* usually solitary, sometimes 2 or 3, subglobose or somewhat hemispherical, usually many-flowered, up to 2 cm wide; *perianth segments* dark brown, narrowly margined, 3-4 mm long, subequal, lanceolate, acuminate, subulate at the apex; *stamens* 6, nearly equaling the perianth, the anthers scarcely 1 mm long, shorter than the filaments; *capsule* oblong-obovoid, abruptly rounded-truncate and more or less retuse at the apex, almost equaling the perianth; *seeds* lanceolate-ovoid, scarcely 0.5 mm long, finely reticulate, minutely apiculate at each end.

Common in montane to alpine meadows and on stream banks and lake margins. Alaska to Alberta, southward to California and New Mexico; eastern Asia.

#### **Forage Value**

Fair for all stock. As an example of the varying palatability of rushes between one locality and another, often little separated, three reports on this species from the Gallatin National Forest, Montana, designate it, respectively, as "low, if any," "excellent," and "80 percent grazed." In the Madison National Forest, Montana, it is said to be "too wiry for good sheep feed," whereas a report from the Idaho National Forest, Idaho maintains that "sheep eat it readily," and three other forests report it as grazed mainly by sheep.



**Plate 33. JUNCUS MERTENSIANUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 34. *Juncus nevadensis* Wats.

*Juncus nevadensis* Wats., Proc. Am. Acad. 14: 303. 1879.

*J. phaeocephalus* var. *gracilis* Engelm., Trans. Acad. Sci. St. Louis 2: 484. 1868.

*J. mertensianus* ssp. *gracilis* (Engelm.) F. J. Herm., Leafl. West. Bot. 10: 85. 1964.

*J. suksdorfii* Rydb., Bull. Torrey Club 26: 541. 1899.

*J. mertensianus* ssp. *gracilis* var. *suksdorfii* (Rydb.) F. J. Herm., Leafl. West. Bot. 10: 86. 1964.

*J. columbianus* Coville, Proc. Biol. Soc. Wash. 14: 87. 1901.

*J. nevadensis* var. *columbianus* (Coville) St. John, Fl. SE. Wash. 82. 1937.

*J. mertensianus* ssp. *gracilis* var. *columbianus* (Coville) F. J. Herm., Leafl. West. Bot. 10: 86. 1964.

Somewhat caespitose perennial from creeping rootstocks; *stems* 1-7 dm high, slender, somewhat compressed; *leaves* subterete, slightly compressed, completely but sometimes obscurely septate, the sheaths projecting into membranaceous auricles 1-3 mm long, the blades 5-20 cm long, 1-2 mm thick; *involucral bracts* much shorter than the inflorescence; *inflorescence* a loose panicle 1-12 cm long, of mostly 5-30, few-flowered, flattened-hemispherical to turbinate heads, 4-10 mm wide; *perianth segments* 3-5.5 mm long, lanceolate-acuminate, from light brown to dark purplish-brown, scarious margined, subequal or the outer segments slightly longer; *stamens* 6, the anthers linear, 1-2 mm long, usually much longer than the filaments; *capsule* dark brown, oblong, rather abruptly contracted into a short beak, about equaling the perianth; *seeds* obliquely obovoid, barely 0.4 mm long, lightly reticulate, minutely apiculate at each end.

Wet banks and meadows, especially along the margins of streams and lakes, from the lowlands to alpine. Rare to occasional in Colorado, western Wyoming, Utah, and Montana, becoming plentiful farther west. Southern British Columbia to California, eastward to western Montana, Wyoming, and Colorado.

#### Forage Value

Good to excellent for cattle and horses, especially as early feed and in hay; less palatable to sheep. One report specifies: "when dry not palatable to sheep but eaten closely by cattle." (See note under *J. tracyi* on importance in hay.)

34a. *Juncus nevadensis* var. *badius* (Suksd.) C. L. Hitchc.

*Juncus nevadensis* var. *badius* (Suksd.) C. L. Hitchc., in Hitchcock *et al.*,  
Vasc. Plants Pac. NW. 1: 201. 1969.  
*J. badius* Suksd., Deuts. Bot. Monats. 19: 92. 1901.  
*J. mertensianus* ssp. *gracilis* var. *badius* (Suksd.) F. J. Herm., Leafl.  
West. Bot. 10: 86. 1964.  
*J. truncatus* Rydb., Bull. Torrey Club 31: 399. 1904.

Similar to var. *nevadensis* but with only 2-5 heads, the perianth about 3 mm long, and anthers only slightly longer than the filaments.  
Chiefly montane and subalpine. Washington and Oregon, eastward to Montana, and southward to Wyoming, Colorado, northern Arizona, northern New Mexico and Chihuahua, Mexico. The commoner form eastward.



Plate 34.

**JUNCUS NEVADENSIS**



Plate 34a.

**JUNCUS NEVADENSIS VAR. BADIUS**

(From Hitchcock *et al.*, Vascular Plants of the Pacific Northwest)

## 7. § ENSIFOLII

### 35. *Juncus ensifolius* Wikst.

*Juncus ensifolius* Wikst., Vet. Akad. Handl. Stockh. 2: 274. 1823.  
*J. xiphioides* var. *triandrus* Engelm., Trans. Acad. Sci. St. Louis 2: 482.  
1868.

Perennial from creeping rootstocks; *stems* 2-6 dm high, compressed, two-edged; *leaves* 1-3 on a culm, the blades flat, strongly compressed laterally, distinctly equitant, partially septate, 7-15 cm long, 3-6 mm wide, the sheath margins rarely prolonged into auricles; *involucral bract* ensiform, usually half the length of the inflorescence or more; *inflorescence* paniculate, of generally 2-5 purplish-brown heads; *perianth segments* lanceolate-acuminate, pale greenish-brown to deep brownish-purple, 3-4 mm long, subequal; *stamens* 3, about two-thirds the length of the perianth, the anthers 0.5-0.7 mm long, shorter than the filaments; *style* usually about 0.5 mm long; *capsule* oblong, abruptly contracted into the beak, usually slightly exceeding the perianth; *seeds* broadly fusiform, finely striate-reticulate, minutely apiculate at each end.

Wet meadows and marshy areas; montane. So far known from a single collection in Arizona (Square Lake, *P. A. South* in 1910) and four in Colorado (Routt and Pitkin Counties), but locally frequent in Wyoming and Utah, and very common in Idaho, western Montana, and westward. Alaska to California and northern Mexico, eastward to Alberta, Montana, and Colorado; also in Quebec (Nottaway River).

#### Forage Value

Variable as forage, from poor in some areas to excellent in others, especially for cattle and horses; more palatable when young and most valuable as hay.



**Plate 35. JUNCUS ENSIFOLIUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

36. *Juncus xiphioides* E. Mey.

*Juncus xiphioides* E. Mey., Syn. Junc. 50. 1822.

*J. xiphioides* var. *auratus* Engelm., Trans. Acad. Sci. St. Louis 2: 481. 1868.

*J. xiphioides* var. *littoralis* Engelm., Trans. Acad. Sci. St. Louis 2: 481. 1868.

Perennial from a thick, creeping rootstock; *stems* 5-9 dm high, stout, compressed; *leaves* equitant, flattened laterally, the sheaths without auricles, the blades 10-40 cm long, (3)7-12 mm wide; *involucral bract* less than half the length of the inflorescence; *inflorescence* a compound panicle of numerous 3- 20-flowered heads; *perianth segments* lanceolate-acuminate, very narrow (revealing the capsule), equal, 3-3.5 mm long, usually light brown, spreading; *stamens* 6, half as long as the perianth, the anthers somewhat shorter than the filaments; *capsule* oblong, acute, gradually contracted below the beak, slightly exceeding the perianth; *seeds* lanceolate-ovoid, reticulate.

Wet habitats in general. In our area known only from Arizona, where it is especially common in the Santa Rita Mountains at 3,500 ft and higher. Southern Oregon and California to Baja California and Arizona.



**37. *Juncus tracyi* Rydb.**

*Juncus tracyi* Rydb., Fl. Rocky Mts. 155 & 1061. 1917.

*J. utahensis* Martin, Rhodora 40: 69. 1938.

*J. tracyi* f. *utahensis* (Martin) F. J. Herm., J. Wash. Acad. Sci. 30: 218. 1940. (A many-headed, few-flowered phase.)

Perennial from stout rhizomes; *stems* 3-6 dm high, compressed; *leaves* 1-3 on a stem, the scarious sheath-margins prolonged into rounded auricles 1-2 mm long, the blades equitant, laterally compressed, incompletely septate, 5-20 cm long, 1.5-4 mm wide; *involucral bract* short, inconspicuous; *inflorescence* paniculate, of 3-9 heads, usually 10-15 mm wide, many-flowered; *perianth segments* 3-4 mm long, lanceolate-acuminate, subequal or the inner slightly shorter, purplish-brown, appressed; *stamens* 6, the anthers from slightly shorter to slightly longer than the filaments; *style* about 1 mm long; *capsule* oblong, mucronate at the rounded apex; *seeds* narrowly oblong, 0.8-1 mm long, short-caudate at each end.

Wet, springy slopes, swamps, low meadows, stream banks, and moist open aspen groves; montane to subalpine. Occasional in New Mexico, Arizona, and central Colorado, becoming frequent to very common in western Colorado, Wyoming, Utah and western Montana. Alberta, Idaho, and Montana, southward to eastern Nevada, Wyoming, New Mexico, and Arizona.

**Forage Value**

Good; from 20 percent to 80 percent grazed; relished by cattle and horses. In the Gallatin National Forest, Montana, it is reported to be grazed from May 1 to October 31. At least locally it supplies a large and important part of the hay crop. The writer has observed the hay harvest in extensive meadows in the Bear River Valley (alt. 8,000 ft), northwest of the Uinta Mountains, Utah, and found the crop to consist almost entirely of a mixture of this species (predominating) and *J. nevadensis*.



**Plate 37. JUNCUS TRACYI**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

### 38. *Juncus saximontanus* A. Nels.

*Juncus saximontanus* A. Nels., Bull. Torrey Club 29: 401. 1902.

*J. xiphioides* var. *montanus* Engelm., Trans. Acad. Sci. St. Louis 2: 481. 1868.

*J. parous* Rydb., Bull. Torrey Club 31: 401. 1904.

*J. ensifolius* var. *montanus* (Engelm.) C. L. Hitchc. et al., Vasc. Plants Pac. NW. 1: 195. 1969.

Perennial from stout, creeping rootstocks; *stems* 4-6 dm high, compressed, two-edged; *leaf blades* flat, laterally compressed, equitant, partially septate, 10-25 cm long, 1.5-4 mm wide, the sheath margins usually prolonged into auricles; *involucral bract* usually less than half the length of the inflorescence; *inflorescence* paniculate, open, of generally 5;10(12) often pale-brownish, 15- 25-flowered heads, 7-10 mm in diameter; *perianth segments* lanceolate, often pale-brownish, 2.5-3 mm long, the outer slightly longer than the inner, appressed; *stamens* 6 (rarely 3), about two-thirds the length of the perianth, generally shorter than the filaments; *style* short, about 0.5 mm long; *capsule* oblong, obtuse below the mucronation, about equaling or slightly shorter than the perianth; *seeds* subfusiform, reticulate.

Frequent to fairly common in most of our area, from the piedmont to subalpine, in wet meadows, bogs, springy woods, and on stream banks and sandy lake shores. Alaska to California and northern Mexico, eastward to Alberta, Colorado, Arizona, and New Mexico.

#### Forage Value

Palatable to all stock and rated generally as good forage (60 percent grazed), especially early in the season. In the Cibola National Forest, New Mexico, it is reported to be cut for hay, as it probably is elsewhere within its range.

### 38a. *Juncus saximontanus* f. *brunnescens* (Rydb.) F. J. Herm.

*Juncus saximontanus* f. *brunnescens* (Rydb.) F. J. Herm., J. Wash. Acad. Sci. 30: 218. 1940.

*J. brunnescens* Rydb., Bull. Torrey Club 31: 400. 1904.

Differing from f. *saximontanus* in having the inflorescence composed of numerous (usually more than 10) heads, which are few (5-12)-flowered and average 5-6 mm in diameter. In typical *J. saximontanus* the few (seldom more than 10) heads are many (15-25)-flowered and average 7-10 mm in diameter. Forma *brunnescens* occurs essentially throughout the range of the typical form but in some areas is much more prevalent, and in others much less frequent, than f. *saximontanus*: in Arizona, for instance, it is by far the commonest rush in the State, whereas in Colorado and Wyoming it is rarity.



**Plate 38. JUNCUS SAXIMONTANUS**

(From Hitchcock et al., Vascular Plants of the Pacific Northwest)

## ADDENDUM

After the completion of this manuscript word was received from Dr. Neil A. Harriman, Biology Dept., University of Wisconsin - Oshkosh, that a Colorado collection by Dr. C. W. Penland (4935) distributed as *Juncus brachycephalus* (Engelm.) Buch. and now in their herbarium, was actually *J. brevicaudatus* (Engelm.) Fern. I have examined the specimen and concur with Dr. Harriman's determination.

The data for this collection are as follows:

In shallow water; drainage of Black Squirrel Creek, few miles NE of Falcon, alt. 6800 ft., El Paso Co., Colo., Aug. 25, 1957.

*Juncus brachycephalus* was collected at the same site on the same date. The occurrence of both species so far from their geographic range as otherwise known (*J. brevicaudatus* being found from Labrador to northern Alberta, southward to Long Island and Pennsylvania, Michigan, northern Illinois, Minnesota, Manitoba and in the mountains of North Carolina) would suggest that they might be merely waifs at the Colorado station. However, Dr. William A. Weber informs me that the Black Squirrel Creek area is known for a congeries of relict mid-western species such as *Stipa spartea*, *Heuchera richardsonii*, *Pedicularis canadensis*, *Hypoxis hirsuta*, *Krigia biflora* and *Aster ptarmicoides*, and since these are certainly not introductions it may well be that the two unexpected *Junci* are also native there.

*Juncus brevicaudatus* would key out to *J. brachycephalus* in the key on page 74. It may be distinguished from it as follows:

Seeds with tails one-tenth to one-third as long as the body; sepals and petals  $\pm$  blunt or rounded at the tip, soft and broadly scarious-margined; cyme open and diffuse, the capsule more or less spreading in the head ..... *J. brachycephalus*

Seeds with tails half as long as the body; sepals and acute petals often subrigid, narrowly scarious-margined; cyme elongate, strict and generally narrow, the capsules erect-appressed in the head .....  
..... *J. brevicaudatus*

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## GLOSSARY

- Acuminate.* Tapering gradually to a point.  
*Acute.* Terminating in a sharp point.  
*Anther.* The pollen-bearing part of a stamen.  
*Anthesis.* The period during which a flower is fully expanded and functional.  
*Apiculate.* Abruptly terminated in a small point.  
*Appressed.* Lying close to and flat against.  
*Areolate.* Marked out into small spaces; reticulate.  
*Aristate.* Awned; tipped with a bristle.  
*Attenuate.* Slenderly tapering or prolonged; more gradual than acuminate.  
*Auricle.* A small, projecting lobe or appendage.  
*Auriculate.* Furnished with auricles.  
*Blade.* The expanded part of a leaf or petal.  
*Bract.* A more or less modified leaf subtending a flower or belonging to an inflorescence.  
*Bracteate.* Having bracts.  
*Bracteole.* A tertiary bract, at the base of the perianth.  
*Bractlet.* A secondary bract, at the base of a pedicel instead of at the base of an inflorescence.  
*Calcareous.* Limy, or rich in calcium carbonate.  
*Capitate.* Shaped like a head; collected into a head or dense cluster.  
*Capsule.* A dry, dehiscent fruit, composed of more than one cell.  
*Cartilaginous.* Firm and tough but flexible, like cartilage or the core of a pear.  
*Caudate.* Having a slender, tail-like appendage.  
*Cauline.* Belonging to the stem.  
*-celled.* The number of locules in an ovary.  
*Cespitose.* Growing in tufts.  
*Conduplicate.* Folded together lengthwise.  
*Culm.* The type of hollow or pithy slender stem found in grasses, sedges and rushes.  
*Cyme.* A type of inflorescence in which the terminal flower blooms first, commonly also with the terminal flower of each branch blooming before the others on that branch.  
*Dehiscent.* Opening at maturity, releasing or exposing the contents.  
*Depauperate.* Impoverished, starved, stunted.  
*Divergent.* Inclining away from each other.  
*Dorsiventral.* Flattened, with the two flattened sides unlike; having a back side and a belly side.  
*Echinate.* Provided with prickles.  
*Ellipsoid.* Solid but with an elliptical outline.  
*Elliptic (elliptical).* With the form of an ellipse.  
*Ensiform.* Sword shaped, as the leaves of *Iris*.  
*Equitant.* Astride, as if riding; used of conduplicate leaves which enfold each other in two ranks, as in *Iris*.  
*Eructate.* Abruptly exerted.

*Exserted*. Projecting beyond - as stamens from a corolla.

*Fastigiate*. Crowded close together, more or less parallel and usually erect.

*Filament*. The stalk of the stamen, i.e., the part which supports the anther.

*Filiform*. Threadlike; long, slender and terete.

*Floriferous*. Flower-bearing.

*Foliaceous*. Leaflike.

*Foliose*. Bearing numerous or crowded leaves.

*Fuscous*. Grayish brown.

*Fusiform*. Spindle shaped; swollen in the middle and narrowing gradually toward each end.

*Gladiata*. Sword shaped, either straight or somewhat curved.

*Glaucous*. With a bluish or whitish, waxy covering.

*Globose*. Spherical; rounded.

*Glomerules*. Compact clusters.

*Head*. An inflorescence of sessile or subsessile flowers crowded closely together at the tip of a peduncle.

*Hyaline*. Thin and colorless or translucent, sometimes transparent.

*Indurated*. Hardened.

*Inflorescence*. The flowering part of a plant, especially the arrangement of the flowers on the axis.

*Involucral bract*. A bract beneath the inflorescence.

*Involute*. With the edges rolled inward, i.e., toward the upper side.

*Lanceolate*. Narrow and tapering to the apex, broadest near the base.

*Ligule*. A thin, collar-shaped appendage on the inside of the leaf-blade at the junction with the sheath.

*Linear*. Long and narrow, with parallel margins.

*Lineolate*. Marked with fine or obscure lines.

*Membranaceous*. Thin, soft and pliable, like a membrane.

*Mucronate*. With a short, sharp, abrupt and slender point.

*Mucronulate*. Diminutive of mucronate.

*Node*. A place on a stem where a leaf is, or has been, attached, often thickened or enlarged.

*Obtuse*. Blunt or rounded at the end.

*Ob-*. Latin prefix signifying the reverse or contrariwise.

*Obovoid*. Inversely ovoid.

*Ovate*. Flat and having the outline of an egg, broadest toward the base.

*Ovoid*. A three-dimensional figure, ovate in outline.

*Panicle*. A loose, irregularly compound inflorescence, with pedicellate flowers, such as a branched raceme.

*Papillate, papillose*. Covered with papillae, i.e., with short, rounded, blunt projections.

*Parietal*. Borne on the walls or on the intruded partial partition of a compound, unilocular ovary.

*Pedicel*. The stalk of a single flower in an inflorescence.

*Pedicellate*. Borne on a pedicel.

*Peduncle*. The stalk of an inflorescence or of a solitary flower.

*Perianth*. All of the sepals and petals (or tepals) of a flower, collectively.

*Perianth segment*. One of the parts of a divided perianth.

*Placenta*. The tissue of the ovary to which the ovules or seeds are attached.

*Polymorphic*. Occurring in several or many different forms.

*Pungent*. Terminating in a rigid, sharp point.

*Reticulate*. In the form of a network; net veined.

*Retuse*. With a shallow notch at a rounded apex.

*Rhizome* (or rootstock). A prostrate, more or less elongate stem, partly or completely beneath the surface of the ground and usually rooting at the nodes.

*Rufescent*. Reddish brown.

*Scabrous*. Rough to the touch.

*Scape*. A naked flowering stem rising from the ground.

*Scapose*. With the flowers on a scape.

*Scarious*. Thin, dry and chaffy in texture, not green.

*Septa* (sing., *septum*). Partitions.

*Septate*. Divided by partitions.

*Sessile*. Not stalked; attached directly by the base.

*Setaceous*. Bristle shaped.

*Sheath*. The tubular basal part of a leaf that encloses the stem.

*Spathiform*. Resembling, or in the form of, a large bract enclosing an inflorescence.

*Spinescent*. Ending in a spine, or bearing a spine.

*Stamen*. The male organ of a flower, consisting of an anther and usually a filament.

*Stoloniferous*. Bearing stolons.

*Stolon*. A trailing shoot above ground, often rooting at the nodes.

*Stramineous*. Straw colored.

*Striate*. Marked with fine longitudinal lines or streaks.

*Style*. The usually slender stalk which typically connects the stigma to the ovary.

*Sub-*. Latin prefix meaning almost or not quite.

*Subulate*. Awl shaped.

*Taxon* (pl. *taxa*). Any taxonomic entity, of whatever rank (such as a species, variety, form, etc.).

*Terete*. Circular in cross section; cylindrical.

*Trigonus*. A three-dimensional figure, triangular in outline.

*Triquetrous*. With three sharp or projecting angles.

*Truncate*. Cut squarely across at the apex or base.

*Turbinate*. Top shaped; inversely conical.

*Umbonate*. Bearing a rounded elevation or protuberance at the end or on the side of a solid organ.

*Valve*. One of the portions of the ovary wall into which a capsule splits at maturity.

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Accepted scientific names are in boldface italics;  
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